

PCnet™ Family

Network Driver Installation Guide

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A D V A N C E D M I C R O D E V I C E S 

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1. PCnet Family Software

The PCnet Family Licensable Technology Kits include software drivers for AMD's PCnet Family of Ethernet controllers:

- PCnet-ISA (Am79C960)
- PCnet-ISA+ (Am79C961)
- PCnet-ISA II (Am79C961A)
- PCnet-32 (Am79C965)
- PCnet-PCI (Am79C970)
- PCnet-PCI II (Am79C970A)
- PCnet-FAST (Am79C971)
- PCnet-FAST+ (Am79C972)

Note: *AMD PCnet Family software is backward compatible to the Am2100/Am1500 architecture. However, the Am2100/Am1500T software drivers for the Am2100/Am1500T/PCnet-ISA architecture may provide unexpected results with the newer PCnet Family of products.*

The AMD PCnet Family software provides support for the following environments:

- Novell Netware 3.1x, 4.x, 5.x (Server ODI, DOS ODI Client, Client 32, OS/2 ODI Client)
- SCO Unixware 1.1 (DLPI), 2.x
- Microsoft LAN Manager 2.x (NDIS 2.01)
- Microsoft Windows for Workgroups 3.1 (NDIS 2.01)
- Microsoft Windows for Workgroups 3.11 (NDIS 2.01/NDIS 3.x)
- Microsoft NDIS 2.01 compatible network environments
 - IBM LAN Server 2.0, 3.x, 4.x
 - SunSoft PC-NFS 5.x
 - Artisoft LANtastic 6.0
- Microsoft Windows NT 3.1, 3.5 (NDIS 3.x), 3.51 (NDIS 3.x) 4.0 (NDIS 4.x)
- Microsoft Windows 95 (NDIS 3.x, NDIS 4.x)
 - (Open Desktop (ODT) 3.0, Open Server R3.0, Gemini 1.0)
- SunSoft Solaris 2.1
- Packet Driver (DOS)

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- Universal Boot ROM
 - Novell NetWare 3.1x, 4.x
 - Microsoft LAN Manager (Server) 2.x
 - IBM LAN Server 2.0, 3.x, 4.x
- VxWorks (for PCnet PCI-II, PCnet-*FAST*, and PCnet-*FAST*+)

2. AMD's Software Driver Policy

A brief summary of AMD's acquisition and distribution policy associated with PCnet-based drivers is presented below.

2.1. Object Code for Internal Testing

The AMD driver diskettes are provided *free of charge* for *evaluation purposes only*. Distribution rights must be obtained as detailed below. Copies of these diskettes can be obtained by contacting your local AMD sales representative.

2.2. Object Code for Distribution

Unlimited, royalty-free rights to distribute the object code and Boot ROM code in the AMD driver diskettes (for all AMD-developed Novell drivers, NDIS 2.01, NDIS 3.x, Packet Driver, and Unix) can be obtained by purchasing a PCnet Licensable Technology Kit and signing the corresponding license agreement. Contact your local AMD sales representative for more information.

2.3. Source Code for Modifications and Distribution

- Source code for the Novell NetWare ODI drivers (Assembly- and C-based) is available to anyone owning a Novell LAN Driver Development Kit (DDK). These drivers and all rights associated with them must be obtained by contacting Novell directly.
- Source code for NDIS 2.01 and Boot ROM can be obtained by purchasing a source code package from AMD. Contact your local AMD sales representative for more information.
- Source code for NDIS 3.x and NDIS 4.x for the Microsoft Windows operating systems can be obtained by purchasing a source code package from AMD. Contact your local AMD sales representative for more information.
- SCO UNIX source code can be obtained by purchasing a source code package from AMD. Contact your local AMD sales representative for more information.
- SCO Unixware source code can be obtained by purchasing a source code package from AMD. Contact your local AMD sales representative for more information.
- Wind River VxWorks source code can be obtained by purchasing a source code package from AMD. Contact your local AMD sales representative for more information.

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- SunSoft Solaris source code can be obtained by purchasing a source code package from AMD. Contact your local AMD sales representative for more information.
- Source code for the Packet Driver is included in the AMD Object Code Driver Diskette.
- Source code for AMD's PCnet Family AMINSTAL utility is included with the PCnet Licensable Technology kits.

Upon purchasing any of the above listed source code packages, customers receive the rights to modify this source code, recompile, and ship unlimited object code versions of this modified driver. Customers receive no rights to redistribute source code. However, customers do receive unlimited object code distribution rights for the unmodified driver.

3. AMINSTAL Utility

Connection to an Ethernet network requires an Ethernet adapter card to be configured and driver software to be installed on the system hard drive. AMD's PCnet Family AMINSTAL utility provides an easy-to-use graphical interface to automatically configure a PCnet (Ethernet) adapter card and install one software driver. The AMINSTAL utility automatically scans the system bus (ISA, VL, or PCI) to identify which PCnet adapter card (PCnet-ISA, PCnet-ISA+, PCnet-ISA II, PCnet-32, PCnet-PCI, or PCnet-PCI II) is present. The PCnet adapter card must then be configured and driver software must be installed on the system hard drive.

The AMINSTAL utility can be used to install the following drivers:

- Novell NetWare DOS ODI client driver
- NDIS 2.01 driver

For other environments, see the appropriate driver installation section for installation instructions.

The following drivers may be installed using the AMINSTAL utility or manually at the command-line prompt:

- NDIS 3.x driver (refer to *Section 7*)
- SCO UNIX LLI driver (refer to *Section 8*)
- SCO Unixware DLPI driver (refer to *Section 10*)
- SunSoft Solaris driver (refer to *Section 12*)

3.1. Running AMINSTAL

The AMINSTAL utility requires Microsoft DOS 3.3 or later. To run the AMINSTAL utility, follow the steps below:

1. Install the PCnet Ethernet adapter card into the system as described in the specific PCnet Hardware User's Manual.
2. Insert the AMD All Drivers diskette into the floppy drive. Make sure HIMEM.SYS is present in the CONFIG.SYS file. To run the AMINSTAL utility faster, copy the disk contents to a temporary directory on the system hard drive.
3. Change the directory to the drive and path where the AMINSTAL utility is located. At the prompt, type:

aminstal.exe
Then press <Enter>.

Note: If the pcnet.txt file is corrupt, the following error message will be displayed:

The pcnet.txt file is an incompatible version.
Please contact an AMD sales representative to receive the correct version.

The pcnet.txt file is a text file used to specify AMINSTAL's characteristics. By changing keywords and text strings in the pcnet.txt file, the AMINSTAL utility can be customized by OEMs without editing and recompiling the program. See Section 3.4, *OEM Customization*, for more information.

4. Follow the screens to complete the card configuration and driver installation for the PCnet adapter card. Refer to Figures 1 through 5 for sample AMINSTAL screens.

Note: Depending on which PCnet adapter card is being configured, the AMINSTAL utility may not allow certain fields to be modified

Although the AMINSTAL utility supports a mouse, a key map is provided below to navigate through the utility without a mouse.

Key	Function
ESC	Exit the configuration or help screen
F1	Help
Tab	Move the cursor to the next position
Left/Right arrows	Move the cursor left or right
<Shift> Tab	Move the cursor to the previous position
Up/Down arrows	Move the cursor up or down
ENTER	Select (Highlight)
Space bar	Select (Highlight)
<Alt> Hot Keys	Select functions

5. To continue, see Section 3.2, *Card Configuration*, and Section 3.3, *Driver Installation*, for specific PCnet adapter card configurations and software driver installation.

3.1.1. PCnet Family Installation Main Window

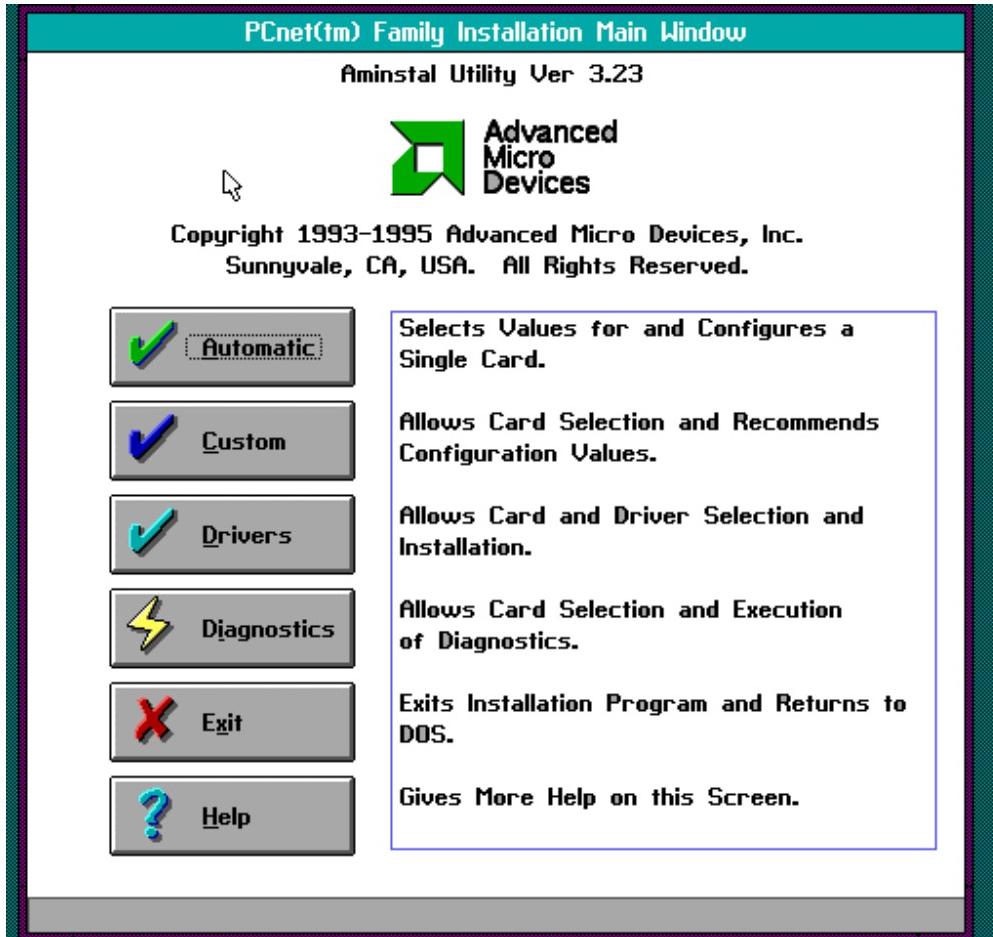


Figure 1. PCnet Family Installation Main Window

The PCnet Family Installation Main Window has the following six button selections: Automatic, Custom, Drivers, Diagnostics, Exit, and Help. Before the Main window appears, the utility searches for a PCnet adapter card in the system. If one is not found, an error screen is displayed telling the user to install the adapter card before using the utility. If only one Ethernet card is found and a conflict-free configuration is determined, the Automatic, Custom, and Drivers buttons are enabled. If more than one card is found or the configuration has conflicts, only the Custom and Drivers buttons are enabled.

3.1.1.1. Automatic and Custom

The Automatic and Custom selections of the AMINSTAL utility are used to configure the PCnet adapter cards. Depending on the PCnet adapter card, the utility allows the

user to view and modify the I/O Address, IRQ Level, and DMA Channel settings. The AMINSTAL utility determines settings that will configure the PCnet card to be compatible with other card settings in the system. The Automatic selection displays system compatible settings. The Custom selection displays the current PCnet card's settings and allows the user to choose the system compatible settings.

Note: *If multiple adapter cards are present, the AMINSTAL utility permits the user to select each adapter card in turn and modify its configuration settings as needed.*

3.1.1.2. Drivers

The Drivers selection of the AMINSTAL utility is used to install the software drivers. Depending on the operating system, the utility allows the user to select a default path or specify the destination.

3.1.1.3. Diagnostics

The Diagnostics selection of the AMINSTAL utility is used to determine PCnet adapter card installation failures. The utility will determine: (1) if the system conflicts with the PCnet adapter card's settings, such as I/O, IRQ, DMA, and also tests T-MAU loopback and EEPROM checksum, and (2) if the PCnet adapter card is connected to the Local Area Network (LAN).

3.1.1.4. Exit

The Exit selection of the AMINSTAL utility quits the program.

3.1.1.5. Help

The Help selection of the AMINSTAL utility displays screen specific information to aid in making selections. The following three help levels are always available:

Help Level	Description
Button Help	The major screens contain a help button, which displays button and field description text when selected.
Field-Selected (F1) Help	Displays helpful information about a selected field.
Dynamic Help (Context Sensitive)	Displays a one-line message at the bottom of the screen when the mouse cursor passes over the selectable item.

3.1.2. Automatic Card Configuration Window

After selecting Automatic in the PCnet Family Installation Main Window, the Automatic Card Configuration Window appears as shown in Figure 2.

The AMINSTAL utility detects and displays the following information:

- Card Name
- Bus Type
- Ethernet Address
- I/O Address
- DMA Channel (default)
- IRQ Level (default)
- Boot ROM Address

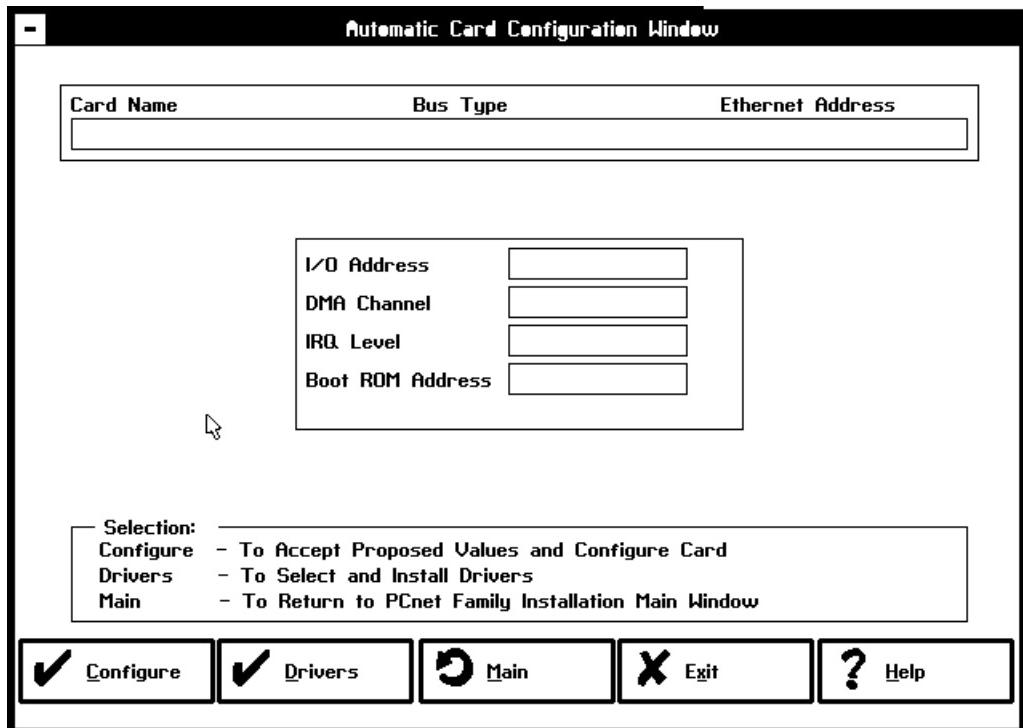


Figure 2. Automatic Card Configuration Window

The Automatic Card Configuration Window has five button selections:

Selection	Description
Configure	To accept proposed values and configure card
Drivers	To select and install drivers
Main	To return to PCnet Family Installation Main Window
Exit	Exits Installation Program and returns to DOS
Help	Gives more help on this screen

Refer to *Section 3.2, Card Configuration*, for configuring a specific PCnet adapter card.

3.1.3. Custom Card Configuration Window

After selecting Custom in the PCnet Family Installation Main Window, the Custom Card Configuration Window appears as shown in Figure 3.

The AMINSTAL utility detects and displays the following information:

- Card Name
- Bus Type
- Ethernet Address
- Card Configuration
- Port Mode
- I/O Address
- DMA Channel (default)
- IRQ Level (default)
- Boot ROM Address

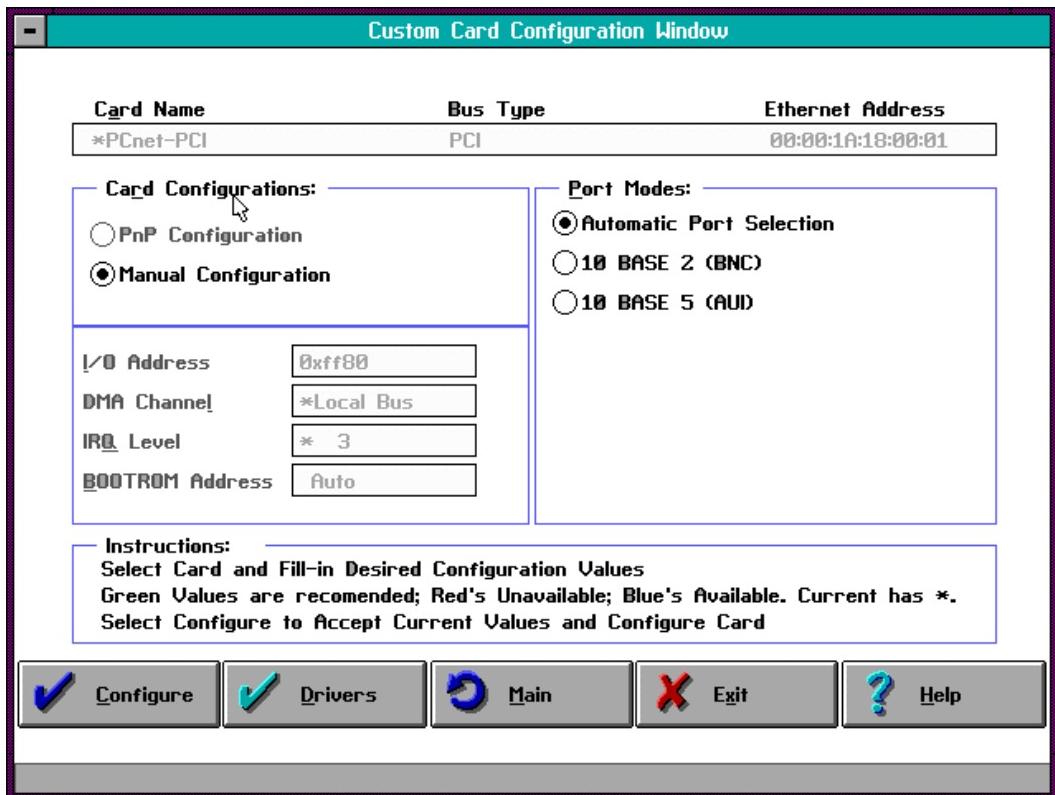


Figure 3. Custom Card Configuration Window

The Custom Card Configuration Window has five button selections:

Selection	Description
Configure	To accept current values and configure card
Drivers	To select and install drivers
Main	To return to PCnet Family Installation Main Window

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Exit	Exits Installation Program and returns to DOS
Help	Gives more help on this screen

Refer to *Section 3.2, Card Configuration*, for configuring a specific PCnet adapter card.

3.1.4. PCnet Driver Installation Window

After selecting Drivers in the PCnet Family Installation Main Window (or the Automatic and Custom Card Configuration Windows), the Driver Installation Window appears as shown in Figure 4. The PCnet Driver Installation Window can be used to install the following drivers:

- Novell NetWare DOS ODI client driver
- NDIS 2.01 driver
- Packet driver
- NDIS 2.01 driver to NDIS 2 DOS Driver
- Microsoft LAN Manager/NDIS 2
- IBM LAN Server/NDIS 2
- Windows for Workgroups 3.1/NDIS 2
- Windows for Workgroups 3.11/NDIS 2
- Windows for Workgroups 3.11/NDIS 3
- Windows for Workgroups 3.11/ODI
- Netware 4.x/ODI
- PC-NFS/NDIS 2
- PC-NFS/ODI
- SCO UNIX/Stream Driver
- Windows NT 3.1/3.5/NDIS 3
- Windows NT 3.1/3.5/ODI Requester

The PCnet Driver Installation Window has four button selections:

Selection	Description
Install	To accept the selections and install the driver
Main	To return to PCnet Family Installation Main Window
Exit	Exits Installation Program and returns to DOS
Help	Gives more help on this screen

Refer to *Section 3.3, Driver Installation*, for complete instructions.

For other environments, refer to the specific driver installation sections (*Section 5* through *Section 11* in this manual).

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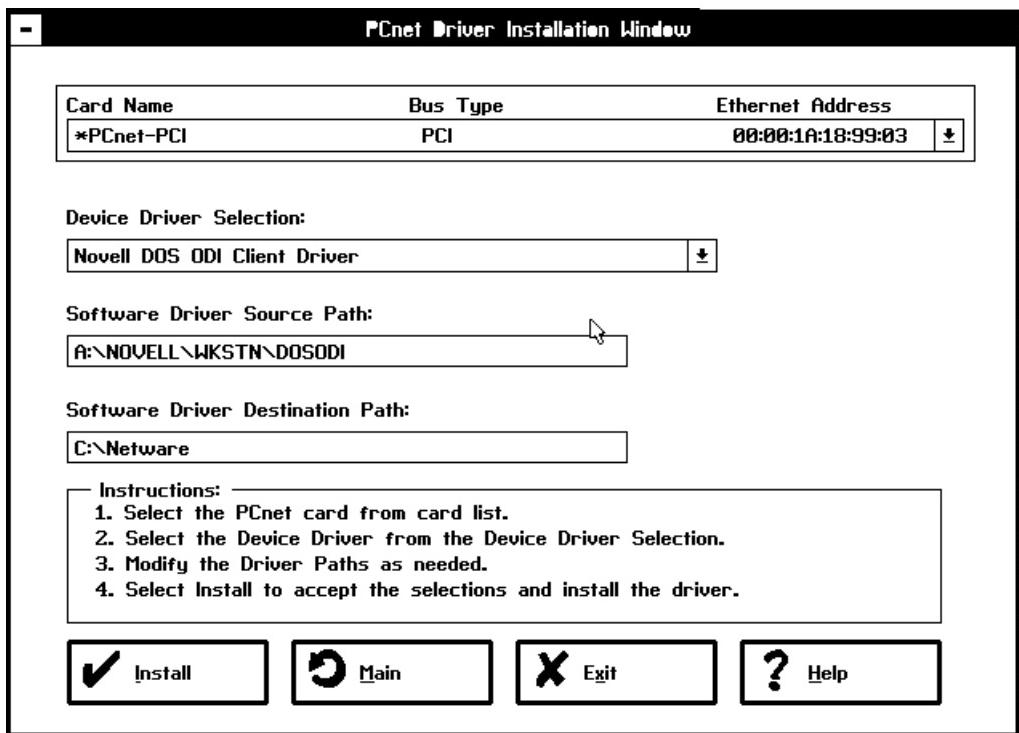


Figure 4. PCnet Driver Installation Window

3.1.5. Diagnostics Window

After selecting Diagnostics in the PCnet Family Installation Main Window, the Diagnostics Window appears as shown in Figure 5. The Diagnostics Window is used to test the PCnet adapter card configuration. The AMINSTAL utility determines if the system conflicts with the card's settings and if the system can communicate with the PCnet adapter card. The test results are PASS, FAIL, and N/A (Not Applicable).

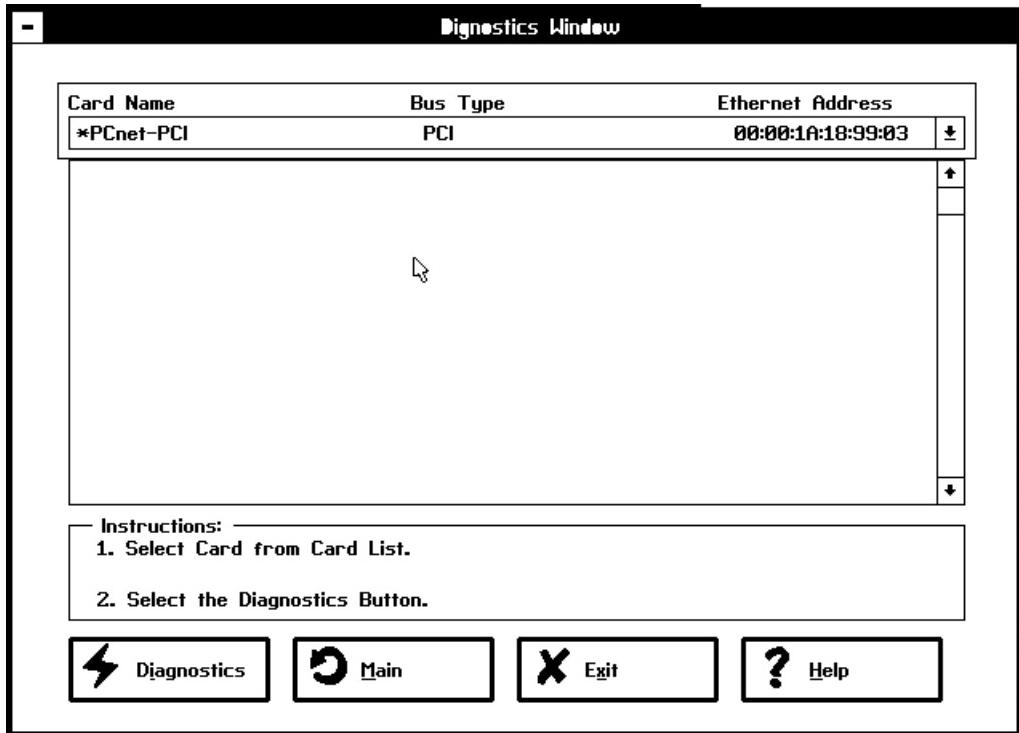


Figure 5. Diagnostics Window

The I/O Address, DMA Channel, and IRQ Level are configuration settings. A PASS test result means the system does not have other cards in the system set to the PCnet cards settings. A FAIL result means the failed setting conflicts with another card in the system. Either the PCnet adapter cards or the conflicting cards settings should be changed. Non-conflicting settings are indicated in the Automatic and Custom configuration windows as blue. A N/A result means the setting does not apply to the PCnet adapter card.

The loopback test indicates whether the computer system was able to communicate with the PCnet adapter card. Information is written to the adapter card and then read from it. A PASS test result means the system could write and read to the adapter card. A FAIL result means the system could not write and read to the adapter card. The loopback test is performed for all PCnet adapter cards.

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The Diagnostics Window has four button selections:

Selection	Description
Diagnostics	To execute diagnostics test
Main	To return to PCnet Family Installation Main Window
Exit	Exits Installation Program and returns to DOS
Help	Gives more help on this screen

3.2. Card Configuration

3.2.1. PCnet-ISA Adapter Card

The AMINSTAL utility detects if a PCnet-ISA adapter card is installed. If an adapter card is not already installed, refer to the *PCnet-ISA Hardware User's Manual* for more information on card installation.

The PCnet-ISA adapter card cannot be configured automatically. To custom configure the PCnet -ISA adapter card, select *Custom* in the PCnet Family Installation Main Window and skip to *Section 3.2.1.2, Custom*.

3.2.1.1. Automatic

The *Automatic* button in the PCnet Family Installation Main Window is not activated for the PCnet-ISA adapter card.

3.2.1.2. Custom

After selecting *Custom* in the PCnet Family Installation Main Window, the Custom Card Configuration Window appears as shown in Figure 6.

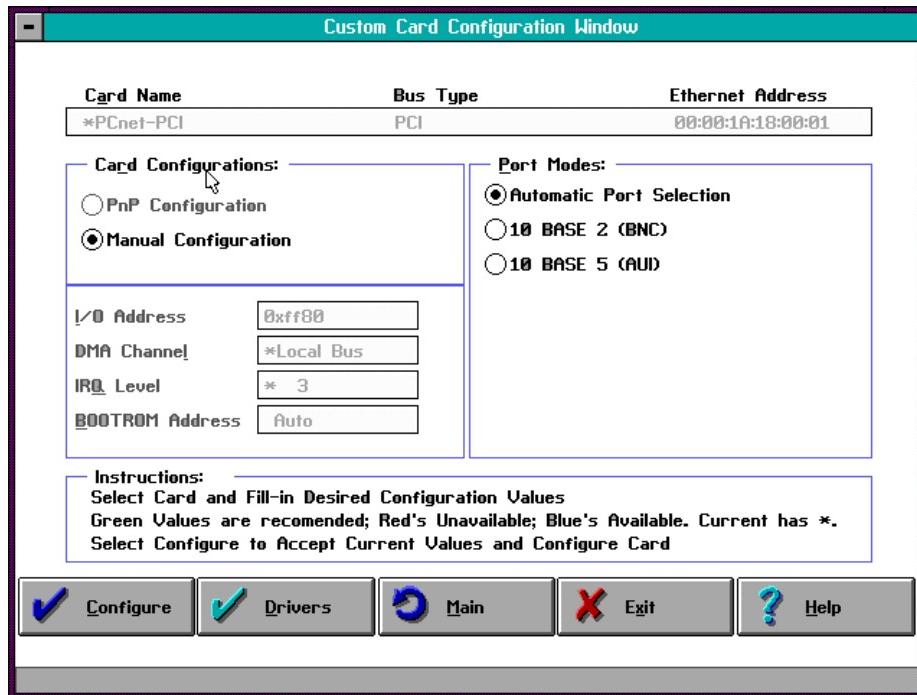


Figure 6. Custom Card Configuration Window

The AMINSTAL utility detects and displays the following information:

- Card Name
- Bus Type
- Ethernet Address
- Card Configuration
- Port Mode
- I/O Address
- DMA Channel (default)
- IRQ Level (default)
- Boot ROM Address

The PCnet-ISA adapter card requires the user to set the appropriate jumpers on the adapter card. However, the jumper settings on the adapter card *must* match the Card Configuration Window settings for proper operation. Otherwise, the following warning message will be displayed:

PCnet-ISA adapter card is not software configurable.
You must set the jumpers on the PCnet-ISA adapter card.

After setting the jumpers and inserting the card, the user must enter the DMA Channel and IRQ Level in the Custom Card Configuration Window. The AMINSTAL utility will not determine the actual IRQ Level and DMA Channel settings for the adapter card, but will display the following default values:

Default DMA Channel	=	5
Default IRQ Level	=	3

After the necessary changes are entered, a software driver may be installed by pressing the Drivers button. Driver configuration of the I/O Address, IRQ Level, and DMA Channel may be modified. Refer to the appropriate driver installation section in this manual.

3.2.1.2.1. Port Mode Selection

Automatic Port Selection is the default port mode. While in the Custom window, the Port Mode may be changed from Automatic Port Selection to 10 BASE 2 (BNC). Automatic Port Selection allows the adapter card to automatically detect which port is connected to the network. If both ports are connected, the card will choose the 10BASE-T port. Triple-port cards may require specific port selection in the Custom Card Configuration Window. Refer to the *PCnet-ISA Hardware User's Manual* for more information.

3.2.1.2.2. Configure

Next, a software driver must be installed. Select Configure so that the AMINSTAL utility can specify the Configuration Options and Port Mode to the software driver as it is installed. Proceed to the appropriate driver installation section to install the software driver.

3.2.1.2.3. Drivers

When ready to select and install a software driver, select the **Drivers** button. Refer to *Section 3.1.4, PCnet Driver Installation Window, and Section 3.3, Driver Installation*, for additional information.

3.2.1.3. Remote Boot

Refer to *Section 15, Installing A Universal Boot ROM*, in this manual.

3.2.2. PCnet-ISA+ and PCnet-ISA II Adapter Card

The AMINSTAL utility detects whether a PCnet-ISA+ (or PCnet-ISA II) adapter card is installed. If a card is not already installed, refer to the *PCnet-ISA+ (or PCnet-ISA II) Hardware User's Manual* for more information on card installation. The PCnet-ISA+ and PCnet-ISA II adapter cards can operate in two modes:

- Microsoft Plug & Play (PnP) ISA Enabled
- Microsoft PnP ISA Disabled

To automatically configure the PCnet-ISA (or PCnet -ISA II) adapter card, select **Automatic** in the PCnet Family Installation Main Window and follow the instructions in *Section 3.2.2.1, Automatic*. To custom configure the adapter card, select **Custom** in the PCnet Family Installation Main Window and skip to *Section 3.2.2.2, Custom*.

3.2.2.1. Automatic

After selecting **Automatic** in the PCnet Family Installation Main Window, the Automatic Card Configuration Window appears as shown in Figure 7.

3.2.2.1.1. PnP ISA Mode Enabled

The AMINSTAL utility detects if a system uses PnP and sets the default parameters. For a PnP system, the AMINSTAL utility detects and displays the following information:

- PCnet-ISA+ (or PCnet-ISA II) adapter card in PnP mode

- I/O Address
- DMA Channel
- IRQ Level

The configuration information is controlled by the PnP BIOS or a PnP configuration manager. If the PnP configuration manager is not loaded, edit the CONFIG.SYS file and reboot the system.

Boot ROM is disabled in PnP mode. To enable Boot ROM, use the Custom Card Configuration Window to disable PnP mode and manually configure the card.

3.2.2.1.2. PnP ISA Mode Disabled

Selecting **Manual Configuration** disables PnP ISA Mode.

Settings are displayed in the following three colors:

Color	Description
Red	Most likely has a system conflict and may need to be changed. Use the Custom Card Configuration Window to change a red-displayed setting.
Blue	No system conflict
Green	Recommended settings

Note: Settings with an asterisk (*) prefix are the PCnet card's current settings.

The user should select green or blue settings for the cards configuration. Green and blue settings will not conflict with other cards' settings. Red settings conflict with other cards' settings in the system. However, note that a PCnet card can be set to red conflicting settings and then transferred to another system. The user must ensure in advance that the red settings will not conflict in the other system.

Note: *System administrators may want to take advantage of this by configuring several PCnet cards to a standard configuration in one system and then transferring them to other end-user systems for installation.*

3.2.2.1.4. Configure

To set the configuration of the adapter card using the AMINSTAL utility, select the Configure button. Next, a software driver must be installed. Proceed to the specific driver installation section for the software driver being installed.

3.2.2.1.5. Drivers

When ready to select and install a software driver, select the Drivers button. Refer to *Section 3.1.4, PCnet Driver Installation Window, and Section 3.3, Driver Installation*, for additional information.

3.2.2.2. Custom

After selecting Custom in the PCnet Family Installation Main Window, the Custom Card Configuration Window appears as shown in Figure 8.

3.2.2.2.1. PnP ISA Mode Enabled

The AMINSTAL utility detects if a system uses PnP and sets the default parameters. For a PnP system, the AMINSTAL utility detects and displays the following information:

- PCnet-ISA+ (or PCnet-ISA II) adapter card in PnP mode
- Bus Type
- Ethernet Address
- I/O Address
- DMA Channel
- IRQ Level

The configuration information is controlled by the PnP BIOS or a PnP configuration manager. If the PnP configuration manager is not loaded, edit the CONFIG.SYS file and reboot the system.

Boot ROM is disabled in PnP mode. To enable Boot ROM, select Manual Configuration to disable PnP mode and manually configure the card.

3.2.2.2.2. PnP ISA Mode Disabled

PnP may be disabled by selecting Manual Configuration.

PCnet Family Network Driver Installation Guide

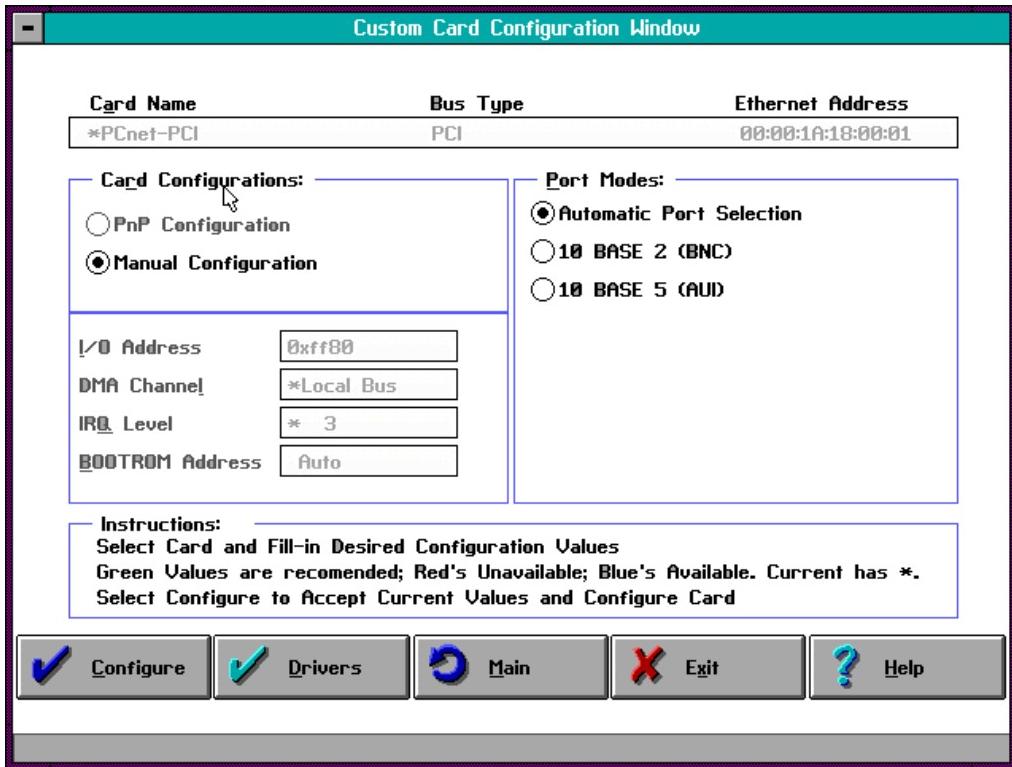


Figure 8. Custom Card Configuration Window

3.2.2.2.3. Manual Configuration

For a non-PnP system (one not responding to a PnP system call), the AMINSTAL utility detects and displays the following information:

- PCnet-ISA+ (or PCnet-ISA II) adapter card in non-PnP mode
- Bus Type
- Ethernet address
- I/O Address
- DMA Channel
- IRQ Level
- Port Mode

The user may change the I/O Address, IRQ Level, and DMA Channel settings. Settings are displayed in the following three colors:

Color	Description
Red	Most likely has a system conflict and may need to be changed. Use the Custom Card Configuration Window to change a red-displayed setting.
Blue	No system conflict
Green	Recommended settings

Note: *Settings with an asterisk (*) prefix are the PCnet card's current settings.*

The user should select green or blue settings for the card's configuration. Green and blue settings will not conflict with other cards' settings. Red settings conflict with other cards' settings in the system. However, note that a PCnet card can be set to red conflicting settings and then transferred to another system. The user *must* ensure in advance that the red settings will not conflict in the other system.

Note: *System administrators may want to take advantage of this by configuring several PCnet cards to a standard configuration in one system and then transferring them to other end-user systems for installation.*

3.2.2.4. Port Mode Selection

Automatic Port Selection is the default port mode. Any other port mode may be selected. Automatic Port Selection allows the adapter card to automatically detect which port is connected to the network. If both ports are connected, the card will choose the 10BASE-T port. Triple-port cards may require specific port selection in the Custom Card Configuration Window. See the *PCnet-ISA+ (or PCnet-ISA II) Hardware User's Manual* for more information.

3.2.2.5. Configure

To set the configuration of the adapter card using the AMINSTAL utility, select the Configure button. Next, a software driver must be installed. Proceed to the specific driver installation section for the software driver being installed.

3.2.2.6. Drivers

When ready to select and install a software driver, select the Drivers button. Refer to Section 3.1.4, *PCnet Driver Installation Window*, and Section 3.3, *Driver Installation*, for additional information.

3.2.2.3. Remote Boot

Refer to Section 15, *Installing A Universal Boot ROM*, in this manual.

3.2.3. PCnet-32 Adapter Card

The AMINSTAL utility detects if a PCnet-32 adapter card is installed. If a card is not already installed, refer to the *PCnet-32 Hardware User's Manual* for more information on card installation.

To automatically configure the PCnet-32 adapter card, select *Automatic* in the PCnet Family Installation Main Window and follow the instructions in *Section 3.2.3.1, Automatic*. To custom configure the adapter card, select *Custom* in the PCnet Family Installation Main Window and skip to *Section 3.2.3.2, Custom*.

3.2.3.1. Automatic

After selecting *Automatic* in the PCnet Family Installation Main Window, the Automatic Card Configuration Window appears as shown in Figure 2.

VL bus systems are not PnP compatible. Hence, configuration options are limited to Manual Configuration. The AMINSTAL utility detects and displays the following information:

- PCnet-32 adapter card
- Bus Type
- Ethernet address
- I/O Address
- DMA Channel
- IRQ Level

The DMA Channel setting is DISABLED since the VL bus designates the DMA Channel according to each slot. Settings are displayed in the following three colors:

Color	Description
Red	Most likely has a system conflict and may need to be changed. Use the Custom Card Configuration Window to change a red-displayed setting.
Blue	No system conflict
Green	Recommended settings

Note: Settings with an asterisk (*) prefix are the PCnet card's current settings.

3.2.3.1.1. Configure

To set the configuration of the adapter card using the AMINSTAL utility, select the *Configure* button. Next, a software driver must be installed. Proceed to the appropriate driver installation section for the software driver being installed.

3.2.3.1.2. Drivers

When ready to select and install a software driver, select the Drivers button. Refer to *Section 3.1.4, PCnet Driver Installation Window, and Section 3.3, Driver Installation*, for additional information.

3.2.3.2. Custom

After selecting Custom in the PCnet Family Installation Main Window, the Custom Card Configuration Window appears as shown in Figure 3.

VL bus systems are not PnP compatible. Hence, configuration options are limited to Manual Configuration. The AMINSTAL utility detects and displays the following information:

- PCnet-32 adapter card
- Bus Type
- Ethernet address
- I/O Address
- DMA Channel
- IRQ Level
- Port Mode

The DMA Channel setting is DISABLED since the VL bus designates the DMA Channel according to each slot. The I/O Address and IRQ Level may be changed. Settings are displayed in the following three colors:

Color	Description
Red	Most likely has a system conflict and may need to be changed. Use the Custom Card Configuration Window to change a red-displayed setting.
Blue	No system conflict
Green	Recommended settings

Note: *Settings with an asterisk (*) prefix are the card's current settings.*

The user should select green or blue settings for the cards configuration. Green and blue settings will not conflict with other cards' settings. The user must be careful not to select red settings. Red settings conflict with other card's settings in the system. However, note that a PCnet card can be set to red conflicting settings and then transferred to another system. The user *must* ensure in advance that the red settings will not conflict in the other system.

Note: *System administrators may want to take advantage of this by configuring several PCnet cards to a standard configuration in one system and then transferring them to other end-user systems for installation.*

3.2.3.2.1. Port Mode Selection

Automatic Port Selection is the default port mode. Any other available port mode may be selected. Automatic Port Selection allows the adapter card to automatically detect which port is connected to the network. If both ports are connected, the card will choose the 10BASE-T port. Triple-port cards may require specific port selection in the Custom Card Configuration Window. See the *PCnet-32 Hardware User's Manual* for more information.

3.2.3.2.2. Configure

To set the configuration of the adapter card using the AMINSTAL utility, select the Configure button. Next, a software driver must be installed. Proceed to the appropriate driver installation section for the software driver being installed.

3.2.3.2.3. Drivers

When ready to select and install a software driver, select the Drivers button. Refer to Section 3.1.4, *PCnet Driver Installation Window*, and Section 3.3, *Driver Installation*, for additional information.

3.2.4. PCnet-PCI Adapter Card

The AMINSTAL utility detects if a PCnet-PCI adapter card is installed. If a card is not already installed, refer to the *PCnet-PCI Hardware User's Manual* for more information on card installation.

To automatically configure the PCnet-PCI adapter card, select *Automatic* in the PCnet Family Installation Main Window and follow the instructions in *Section 3.2.4.1, Automatic*. To custom configure the adapter card, select *Custom* in the PCnet Family Installation Main Window and skip to *Section 3.2.4.2, Custom*.

3.2.4.1. Automatic

After selecting *Automatic* in the PCnet Family Installation Main Window, the Automatic Card Configuration Window appears as shown in Figure 2. The AMINSTAL utility detects and displays the following information:

- PCnet-PCI adapter card
- Bus Type
- Ethernet address
- I/O Address
- DMA Channel
- IRQ Level

The I/O Address, IRQ Level, and DMA Channel are assigned by the PCI system BIOS. The DMA Channel in the PCI bus is slot specific and is not associated to a number. The user may not modify the configuration options for the PCnet-PCI adapter card.

3.2.4.1.1. Configure

To set the configuration of the adapter card using the AMINSTAL utility, select the *Configure* button. Next, a software driver must be installed. Proceed to the appropriate driver installation section for the software driver being installed.

3.2.4.1.2. Drivers

When ready to select and install a software driver, select the *Drivers* button. Refer to *Section 3.1.4, PCnet Driver Installation Window, and Section 3.3, Driver Installation*, for additional information.

3.2.4.2. Custom

After selecting *Custom* in the PCnet Family Installation Main Window, the Custom Card Configuration Window appears as shown in Figure 3.

The AMINSTAL utility detects and displays the following information:

- PCnet-PCI adapter card
- Bus Type
- Ethernet address
- I/O Address
- DMA Channel
- IRQ Level
- Port Mode

The I/O Address, IRQ Level, and DMA Channel are assigned by the PCI system BIOS. The DMA Channel in the PCI bus is slot specific and is not associated to a number. The user cannot modify the configuration options for the PCnet-PCI adapter card.

3.2.4.2.1. Port Mode Selection

Automatic Port Selection is the default port mode. Any other port mode may be selected. Automatic Port Selection allows the adapter card to automatically detect which port is connected to the network. If both ports are connected, the card will choose the 10BASE-T port. Triple-port cards may require specific port selection in the Custom Card Configuration Window. Refer to the *PCnet-PCI Hardware User's Manual* for more information.

3.2.4.2.2. Configure

To set the configuration of the adapter card using the AMINSTAL utility, select the Configure button. Next, a software driver must be installed. Proceed to the appropriate driver installation section for the software driver being installed.

3.2.4.2.3. Drivers

When ready to select and install a software driver, select the Drivers button. Refer to *Section 3.1.4, PCnet Driver Installation Window, and Section 3.3, Driver Installation*, for additional information.

3.3. Driver Installation

The PCnet Driver Installation Window of the AMINSTAL utility can be used to install the following drivers:

- Novell NetWare DOS ODI client driver
- NDIS 2.01 driver
- Packet driver
- NDIS 2.01 driver to NDIS 2 DOS Driver
- Microsoft LAN Manager/NDIS 2
- IBM LAN Server/NDIS 2
- Windows for Workgroups 3.1/NDIS 2
- Windows for Workgroups 3.11/NDIS 2
- Windows for Workgroups 3.11/NDIS 3
- Windows for Workgroups 3.11/ODI
- Netware 4.x/ODI
- PC-NFS/NDIS 2
- PC-NFS/ODI
- SCO UNIX/Stream Driver
- Windows NT 3.1/3.5/NDIS 3
- Windows NT 3.1/3.5/ODI Requester

For other environments, refer to the appropriate driver installation section in this manual for instructions.

Select Drivers in the PCnet Family Installation Main Window (also in the Automatic Card Configuration Window or Custom Card Configuration Window). The PCnet Driver Installation Window will appear as shown in Figure 4. A driver may be installed by selecting the driver and specifying the destination directory. Select Install to copy the driver to the system hard drive.

- Notes:**
- 1) When the AMINSTAL utility installs a device driver, it creates sample CONFIG.NET, AUTOEXEC.NET, and PROTOCOL.INI or NET.CFG files. The user may use these files as examples to modify the system's CONFIG.SYS and AUTOEXEC.BAT files.
 - 2) See *Installing the NDIS 2.01 Driver* section (Microsoft LAN Manager) for more information on the PROTOCOL.INI file. See Appendix A for more information on the NET.CFG file.

Some drivers must be installed using the Network Operating System's OEM installation guidelines. Refer to *Section 4, Automatic OEM Installation*, for more information.

3.4. OEM Customization

OEMs can customize the AMINSTAL utility in the following ways:

1. The PCnet Family Installation Main Window must be customized by replacing the AMD-specific graphics and text with OEM-specific graphics and text.
2. The FFFF card placeholder must be changed to the manufacturer's IEEE address prefix.
3. The button labels, window titles, data labels, screen text, and help messages of each section are customizable and can be in any language.

The pcnet.txt file specifies AMINSTAL's characteristics. By changing keywords and text strings in pcnet.txt, the utility can be customized without editing and recompiling the program. The pcnet.txt file is located in the a:\aminstal directory on the All Drivers disk. It is important to test run the AMINSTAL utility after each text string modification to identify editing mistakes, such as deleted or extra quotes and missing text, which will prevent the program from running.

Refer to *Appendix E, PCnet Family AMINSTAL Utility OEM Customization Guide*, for further customization details.

AMINSTAL Utility

4. Automatic OEM Installation

Automatic OEM installation is structured into some of the AMD PCnet Family software driver diskettes. The directory structures on these diskettes are set up to correspond to a network operating system's search path during the installation process.

The following environments are supported for automatic OEM installation:

ODI

- Novell NetWare 4.x (DOS and Server)
- Novell NetWare 5.x (Server)

NDIS 2.01

- Microsoft LAN Manager 2.x
- IBM LAN Server 2.0, 3.x, 4.x
- Microsoft Windows for Workgroups 3.1 and 3.11
- SunSoft PC-NFS 5.x
- Artisoft LANtastic 6.0

NDIS 3.x

- Microsoft Windows for Workgroups 3.11
- Microsoft Windows NT 3.1, 3.5
- Microsoft Windows NT 3.51
- Microsoft Windows 95

NDIS 4.x

- Microsoft Windows 95
- Microsoft Windows NT 4.0

UNIX

- SCO UNIX 3.2.4 (Open Desk Top (ODT) 3.0)
- SCO Unixware 1.1, 2.x
- SunSoft Solaris 2.1
- SCO UNIX Open Server 5.0
- SCO UNIX Gemini 1.0

Note: Refer to the appropriate OEM User Manuals for specific instructions on loading additional drivers from an external floppy diskette.

5. Installing Novell NetWare ODI Drivers

Open Datalink Interface (ODI) is a driver specification developed by Novell to offer a standard driver interface for Novell NetWare. AMD provides driver support for the following environments:

- Novell NetWare 3.1x
- Novell NetWare 4.x
- Novell NetWare 5.x

and AMD provides the following drivers:

- 32 bit ODI driver for NetWare Server 3.1x, 4.x, 5.x and Client 32
- 16 bit ODI driver for NetWare DOS ODI Client
for NetWare OS/2 ODI Client

Installation procedures for each of the above drivers are described in the following sections.

5.1. Novell NetWare DOS ODI Client

AMD's NetWare DOS ODI client driver may be installed using the automated AMINSTAL utility or manually from the command line prompt. Both methods are explained below.

Note: *The user may need to make modifications to autoexec.bat, using the AMD-supplied sample autoexec.net file as reference.*

5.1.1. Driver Installation Using the AMINSTAL Utility

Follow the steps listed below:

- 1 Run the AMINSTAL utility to configure your PCnet adapter card's I/O base address, IRQ channel, and DMA channel.

See the AMINSTAL Utility section for more information on configuring your PCnet adapter card.

After you have completed the configuration of your PCnet adapter card using the AMINSTAL utility, go to step 2 below to continue.

- 2 Select the Continue button in the Configuration dialog box. The Installation dialog box will appear.
- 3 Select the desired PCnet adapter card by highlighting it in the top of the dialog box.

- ___4 Highlight the Novell ODI DOS Client driver for the NetWare environment. Change the default path if necessary.
- ___5 Press the Continue button to install the driver. The AMINSTAL utility will then copy the driver into the specified directory, create a NET.CFG file in the specified directory, and copy a sample AUTOEXEC.NET file into the specified directory. The AUTOEXEC.NET file contains the following command lines:

```
LSL  
PCNTNW  
IPXODI  
NETX
```

The user must copy the following files into the specified directory above:

•LSL.COM	(Link Support Layer)
•PCNTNW.COM	(AMD NetWare DOS ODI Client driver)
•IPXODI.COM	(An IPX protocol stack file)
•NETX.EXE	(NetWare Shell, used with conventional memory workstations)

The LSL.COM, IPXODI.COM, and NETX.EXE files can be obtained from the Workstation Driver Diskette in the Novell Client Software Package or from CompuServe. The AMD-supplied client driver file PCNTNW.COM can be obtained from the DOS ODI directory of the AMD NetWare driver diskette (i.e., a:\novell\wkstn\dosodi).

- ___6 Exit from the AMINSTAL utility when the installation has completed.

The installation of the NetWare DOS ODI client driver is now complete.

5.1.2. Driver Installation From The Command Line Prompt

Follow the steps listed below:

- ___1 Insert the AMD DOS ODI driver diskette into the floppy drive.
- ___2 Create a subdirectory in your client's main boot drive with the following files:

•LSL.COM	(Link Support Layer)
•PCNTNW.COM	(AMD Netware DOS ODI Client Driver)
•IPXODI.COM	(An IPX protocol stack file)
•NETX.EXE	(Netware Shell, used with conventional memory workstations)

•NET.CFG	(Optional (used for configuring options different from the default settings). See <i>Appendix A</i> or the Novell Netware Operating
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System Keywords section.)

The NETX.EXE, LSL.COM, and IPXODI.COM files can be obtained from the Workstation Driver Diskette in the Novell Client Software Package or from CompuServe. Copy the AMD-supplied client driver file (PCNTNW.COM) from the DOS ODI directory of the AMD NetWare driver diskette to the appropriate subdirectory. To do this, copy the file using the following path:

A :\NOVELL\WKSTN\ DOSODI

- 3 To manually load these files from the DOS prompt, type the following commands in the given order to initialize DOS ODI driver support and the IPX protocol stack:

LSL.COM	Followed by <Enter>
PCNTNW.COM	Followed by <Enter>
IPXODI.COM	Followed by <Enter>
NETX.EXE	Followed by <Enter>

Note: NETX.EXE is compatible with DOS Versions 3.x, 4.x, 5.x, and 6.x.

- 4 To automatically load these files, use a DOS text editor to create and/or modify an AUTOEXEC.BAT file. Load the files in the following order: (1) link support layer, (2) LAN driver, (3) protocol stacks, and (4) the shell. Your AUTOEXEC.BAT file should look similar to the following:

```
\<subdirectory>\LSL  
\<subdirectory>\PCNTNW  
\<subdirectory>\IPXODI  
\<subdirectory>\NETX
```

- 5 When the commands have been added to the AUTOEXEC.BAT file, reboot the workstation. After the commands execute and if a server is present, the workstation will attach to the server and display the server's name.
—6 Log onto the network.

The installation of the NetWare DOS ODI client driver is now complete.

5.1.3. Driver Installation For The LAPP Driver

Follow the steps listed below:

- 1 Insert the AMD DOS LAPP driver diskette into the floppy drive.

- 2 Create a subdirectory in your client's main boot drive with the following files:
- LSL.COM (Link Support Layer)
 - PCLAPP.COM (AMD Netware DOS ODI LAPP Driver)
 - IPXODI.COM (An IPX protocol stack file)
 - NETX.EXE (Netware Shell, used with conventional memory workstations)
-
- NET.CFG (Optional (used for configuring options different from the default settings). See *Appendix A* or the Novell Netware Operating System Keywords section.)

The NETX.EXE, LSL.COM, and IPXODI.COM files can be obtained from the Workstation Driver Diskette in the Novell Client Software Package or from CompuServe. Copy the AMD-supplied client driver file (PCLAPP.COM) from the DOS ODI directory of the AMD NetWare driver diskette to the appropriate subdirectory. To do this, copy the file using the following path:

A:\LAPP\ DOSODI

- 3 To manually load these files from the DOS prompt, type the following commands in the given order to initialize DOS ODI driver support and the IPX protocol stack:

LSL.COM	Followed by <Enter>
PCLAPP.COM	Followed by <Enter>
IPXODI.COM	Followed by <Enter>
NETX.EXE	Followed by <Enter>

Note: NETX.EXE is compatible with DOS Versions 3.x, 4.x, 5.x, and 6.x.

- 4 To automatically load these files, use a DOS text editor to create and/or modify an AUTOEXEC.BAT file. Load the files in the following order: (1) link support layer, (2) LAN driver, (3) protocol stacks, and (4) the shell. Your AUTOEXEC.BAT file should look similar to the following:

```
\<subdirectory>\LSL  
\<subdirectory>\PCLAPP  
\<subdirectory>\IPXODI  
\<subdirectory>\NETX
```

- 5 When the commands have been added to the AUTOEXEC.BAT file, reboot the workstation. After the commands execute and if a server is present, the workstation will attach to the server and display the server's name.
- 6 Log onto the network.

The installation of the NetWare DOS ODI LAPP driver is now complete.

Note: *The LAPP driver cannot work on a PCnet-ISA board.*

5.1.4. Keyword Examples

To change any default settings after the driver is loaded, the user must create a NET.CFG file on the workstation diskette. See Section 5.6, *Novell NetWare Operating System Keywords* for more information on valid keywords. See Appendix A for sample NET.CFG files using various keywords.

Note: *The Novell Netware ODI DOS installation documentation will provide additional information on installing the DOS ODI driver and using keywords during installation.*

5.2. Novell NetWare OS/2 ODI Client

To install AMD's OS/2 ODI client driver, the Novell OS/2 Requester should be used.

Load the NetWare OS/2 ODI client driver from the OS/2 CONFIG.SYS file in the sequence given below. See the *Novell NetWare Requester OS/2 Installation* documentation for more information.

After installing the OS/2 Requester, follow the steps listed below:

- __1 Using the Netware OS/2 disks provided by Novell, install the Netware OS/2 Requester files on the client. Follow the instructions displayed to configure the Netware OS/2 Requester for a Netware-supported LAN adapter card. If the Netware-supported LAN adapter card contains the PCnet adapter option, select it; otherwise, select any other LAN adapter.
- __2 Insert the AMD NetWare driver diskette into the floppy drive.
- __3 Copy the OS/2 ODI driver (PCNTNW.OS2) from the AMD NetWare driver diskette to the C:\NETWARE directory of the boot drive using the following path:

A:\NOVELL1\WKSTN\OS2ODI\PCNTNW.OS2

- __4 Edit the CONFIG.SYS file and replace the Netware-supported LAN adapter driver with the name of the AMD OS/2 ODI driver (PCNTNW.OS2). For example:

DEVICE=C:\NETWARE\PCNTNW.OS2

If the Novell OS/2 Requester is used to install the driver, the Requester will automatically make modifications to the CONFIG.SYS file.

The following is an example of the CONFIG.SYS load sequence for NetWare 3.12 OS/2 ODI driver support using the IPX protocol stack:

```
REM --- Netware Requester Statements BEGIN ---
SET NWLANGUAGE=ENGLISH
DEVICE=C:\NETWARE\LSL.SYS
RUN=C:\NETWARE\DDAEMON.EXE
REM -- ODI-Driver Files BEGIN --
DEVICE=C:\NETWARE\PCNTNW.OS2
REM DEVICE=C:\NETWARE\ROUTE.SYS
REM -- ODI-Driver Files END --
DEVICE=C:\NETWARE\IPX.SYS
DEVICE=C:\NETWARE\SPX.SYS
RUN=C:\NETWARE\SPDAEMON.EXE
DEVICE=C:\NETWARE\NWREQ.SYS
IFS=C:\NETWARE\NWIFS.IFS
RUN=C:\NETWARE\NWDAEMON.EXE
DEVICE=C:\NETWARE\VIPX.SYS
```

Installing Novell Netware ODI Drivers

```
DEVICE=C:\NETWARE\VSHELL.SYS GLOBAL  
REM --- Netware Requester Statements END ---
```

The default settings may be modified when the driver loads by creating the NET.CFG file. The AMD OS/2 ODI client driver may also be installed to support multiple protocol stacks and Ethernet frame types. Refer to Appendix A for sample NET.CFG files using the optional keywords. Also, refer to the *Novell Netware Requester OS/2 Installation* documentation for more information on configuring the NET.CFG file.

- 5 Reboot the system.

The installation of the NetWare OS/2 ODI client driver is now complete.

5.2.1. Keyword Examples

To change any default settings when the driver is loaded, the user must create a NET.CFG file on the workstation diskette. The *Novell NetWare Operating System Keywords* section provides a list of the available keywords. See Appendix A for sample NET.CFG files using common keywords used when installing the OS/2 ODI client driver.

5.3. Novell NetWare Server 3.11

For a NetWare Server 3.11 configuration, AMD provides a NetWare 3.11 Server ODI driver on the AMD NetWare driver diskette. Use the LOAD and BIND commands to load the NetWare 3.11 ODI server driver as described below. For more information on these commands, refer to the *Novell NetWare 3.11 LAN Driver Installation* documentation.

There are two methods for loading the NetWare Server 3.11 driver: (1) use the server command line prompt (:) or (2) edit the AUTOEXEC.NCF file.

Note: If you use the server command line, you will need to load the driver each time the system is booted. If you edit the AUTOEXEC.NCF file, it will automatically load the driver each time your system is booted.

WARNING: Be sure to use the Monitor Program, which is included on the AMD NetWare driver diskette. Do not use the original Monitor Program shipped with NetWare 3.11 because it will cause the system to crash (known software bug).

Follow the steps listed below:

- __1 Install the Novell NetWare Server 3.11 on your system.
- __2 Copy all the files from the 3.11 server directory of the AMD NetWare driver diskette to the hard disk directory where the NetWare 3.11 system files are located. The following path should be used to access the files from the AMD NetWare driver diskette:

A:\NOVELL\SERVER\3.1x\PCNTNW.LAN

- __3 Boot NetWare by executing SERVER.EXE. Refer to the appropriate *Novell NetWare* documentation on loading disk drivers and mounting volumes for more information.
- __4 To load the driver manually, follow either step 4.1 (for a PCnet-ISA Adapter Card) or step 4.2 (for PCnet-ISA+, PCnet-ISA II, PCnet-32, PCnet-PCI, and PCnet-FAST Adapter Cards). If you want to load the driver using the AUTOEXEC.NCF file, go to step 5.

Note: You will need to specify the DOS path if the driver is located in a DOS partition.

- __ 4.1 To manually load the driver for a PCnet-ISA adapter card:

- a. Type the following command at the file server console (which also changes the default settings for PCnet-ISA adapter cards):

LOAD LSLENH.NLM

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```
LOAD MSM31X.NLM  
LOAD ETHERTSM.NLM  
LOAD PCNTNW PORT=320 INT=5 DMA=7 FASTISA
```

- Notes:**
- 1) All of the files listed above are needed. You must use the versions of these files included on the AMD driver diskettes.
 - 2) Make sure the LSLENH, MSM31X, PATCHMAN, and ETHERTSM files are present in the same directory as the PCNTNW.LAN file. These files should be copied from the AMD NetWare support files driver diskette from the 3.11 subdirectory under the Novell directory. You must use the latest versions of these files provided in the AMD diskette.

- b. Then press <Enter>. The PORT, INT, and DMA values used above must correspond to the PCnet-ISA adapter card's jumper settings.

Note: IOP, IRQ, and DRQ are older keywords previously used in place of PORT, INT, and DMA, respectively. However, they are still supported in order to maintain backward compatibility.

- c. Next, bind the driver to the IPX protocol stack by typing:

```
BIND IPX TO PCNTNW NET=xxxx  
(Bind to IPX or any other protocol stack; where e.g., xxxx=1234)
```

- d. Then press <Enter>.

The installation of the NetWare Server 3.11 driver is now complete.

—4.2 To manually load a driver for PCnet-ISA+, PCnet-ISA II, PCnet-32, PCnet-PCI, and PCnet-FAST adapter cards:

- a. Type the following commands at the file server console:

```
LOAD LSLENH.NLM  
LOAD MSM31X.NLM  
LOAD ETHERTSM.NLM  
LOAD PCNTNW
```

Note: All of the files listed above are needed. You must use the versions of these files included on the AMD driver diskettes.

- b. Then press <Enter>.

The PCNTNW driver automatically determines the adapter card configuration information.

- c. Next, bind the driver to the IPX protocol stack by typing:

```
BIND IPX TO PCNTNW NET=xxxx  
(Bind to IPX or any other protocol stack; where e.g., xxxx=1234)
```

- d. Then press <Enter>.

The installation of the NetWare Server 3.11 driver is now complete.

- 5. To load the driver using the AUTOEXEC.NCF file, you must first edit the AUTOEXEC.NCF file.

Note: You will need to specify the DOS path if the driver is located in a DOS partition.

- a. Type LOAD INSTALL at the server prompt (:) to access the Install Utility.
- b. Open the SYSTEM OPTIONS menu to access EDIT AUTOEXEC.
- c. Then add the following command lines to the AUTOEXEC.NCF file.

The following is a PCnet-ISA adapter card example:

```
LOAD C:\PCNTNW DMA=5 INT=3 PORT=320 FRAME=Ethernet_802.2  
BIND IPX TO PCNTNW NET=xxxx  
(Bind to IPX or any other protocol stack; where e.g., xxxx=1234)
```

Note: IOP, IRQ, and DRQ are older keywords previously used in place of PORT, INT, and DMA, respectively. However, they are not supported starting from Release 4.0.

The installation of the NetWare Server 3.11 driver is now complete.

5.3.1. Keyword Examples

See *Keyword Examples* under Section 5.5, Novell NetWare Server 4.x , to use keywords for NetWare Server 3.11.

5.4. Novell NetWare Server 3.12

For a Novell NetWare Server 3.12 configuration, AMD provides a NetWare 3.1.2 Server ODI driver, which is included on the AMD NetWare driver diskette.

Note: *The directory structure provided on the AMD NetWare driver diskette has been set up for automatic OEM installation. Also, more information can be found in the Novell NetWare 3.12 documentation.*

Use the LOAD and BIND commands to load the NetWare 3.12 ODI server driver as described below. For more information on these commands, refer to the *Novell NetWare 3.12 LAN Driver Installation* documentation.

There are two methods for loading the NetWare Server 3.12 driver: (1) use the server command line prompt (:) or (2) edit the AUTOEXEC.NCF file.

Note: *If you use the server command line, you will need to load the driver each time the system is booted. If you edit the AUTOEXEC.NCF file, it will automatically load the driver each time your system is booted.*

Follow the steps listed below:

- __1 Install NetWare 3.12 on your system.
- __2 Copy the AMD ODI Server driver (PCNTNW.LAN) from the AMD NetWare driver diskette to the hard disk directory where the NetWare 3.12 system files are located. The following path should be used to access the files from the AMD NetWare driver diskette:

A:\NOVELL\SERVER\3.1x\PCNTNW.LAN
- __3 Boot NetWare by executing SERVER.EXE. Refer to the appropriate *Novell NetWare* documentation on loading disk drivers and mounting volumes for more information.
- __4 To load the driver manually, follow either step 4.1 (for a PCnet-ISA Adapter Card) or step 4.2 (for PCnet-ISA+, PCnet-ISA II, PCnet-32, PCnet-PCI, and PCnet-FAST Adapter Cards). If you want to load the driver using the AUTOEXEC.NCF file, go to step 5.

Notes:

- 1) You will need to specify the DOS path if the driver is located in a DOS partition.
- 2) Make sure the MSM31X.NLM and ETHERTSM.NLM files are present in the same directory as the PCNTNW.LAN file. These files should be copied from the AMD NetWare support files driver diskette from the 3.12 subdirectory under the Novell directory. You must use the latest versions of these files provided in the AMD diskette.

4.1 To manually load the driver for a PCnet-ISA adapter card:

- a. Type the following command at the file server console (which also changes the default settings for PCnet-ISA adapter cards):

```
LOAD C:\PCNTNW PORT=320 INT=5 DMA=7 FASTISA
```

- b. Then press <Enter>.

The PORT, INT, and DMA values used above must correspond to the PCnet-ISA adapter card's jumper settings.

Note: *IOP, IRQ, and DRQ are older keywords previously used in place of PORT, INT, and DMA, respectively. However, they are still supported in order to maintain backward compatibility..*

- c. Next, bind the driver to the IPX protocol stack by typing:

```
BIND IPX TO PCNTNW NET=xxxx  
(Bind to IPX or any other protocol stack; where e.g., xxxx=1234)
```

- d. Then press <Enter>.

The installation of the NetWare Server 3.12 driver is now complete.

4.2 To manually load a driver for a PCnet-ISA+, PCnet-ISA II, PCnet-32, PCnet-PCI, or PCnet-FAST adapter card:

- a. Type the following command at the file server console:

```
LOAD C:\PCNTNW
```

- b. Then press <Enter>.

- c. Next, bind the driver to the IPX protocol stack by typing:

```
BIND IPX TO PCNTNW NET=xxxx  
(Bind to IPX or any other protocol stack; where e.g., xxxx=1234)
```

- d. Then press <Enter>.

The installation of the NetWare Server 3.12 driver is now complete.

5 To load the driver using AUTOEXEC, you must first edit the AUTOEXEC.NCF file.

- a. Type `LOAD INSTALL` at the server prompt (:) to access the Install Utility.

Note: You will need to specify the DOS path if the driver is located in a DOS partition.

- b. Open the SYSTEM OPTIONS menu to access `EDIT AUTOEXEC`.
- c. Then add the following command lines to the `AUTOEXEC.NCF` file.

The following is a PCnet-ISA adapter card example:

```
LOAD C:\PCNTNW DMA=5 INT=3 PORT=320 FRAME=Ethernet_802.2  
BIND IPX TO PCNTNW NET=xxxx  
(Bind to IPX or any other protocol stack; where e.g., xxxx=1234)
```

Note: *IOP, IRQ, and DRQ are older keywords previously used in place of PORT, INT, and DMA, respectively. However, they are not supported starting from Release 4.0.*

The installation of the NetWare Server 3.12 driver is now complete.

5.4.1. Keyword Examples

See *Keyword Examples* under *Section 5.5, Novell NetWare Server 4.x*, to use keywords for NetWare Server 3.12.

5.5. Novell NetWare Server 4.x

For a NetWare 4.x server configuration, AMD provides a NetWare 4.x Server ODI driver which is included on the AMD NetWare driver diskette.

Note: *The directory structure provided on the AMD NetWare driver diskette has been set up for automatic OEM installation. Also, more information can be found in the Novell NetWare 4.x documentation.*

Use the LOAD and BIND commands to load the NetWare 4.x ODI server driver as described below. For more information on these commands, refer to the *Novell NetWare 4.x LAN Driver Installation* documentation.

There are two methods for loading the NetWare Server 4.x driver: (1) use the server command line prompt (:) or (2) edit the AUTOEXEC.NCF file.

Note: *If you use the server command line, you will need to load the driver each time the system is booted. If you edit the AUTOEXEC.NCF file, it will automatically load the driver each time your system is booted.*

Follow the steps listed below:

- 1 Install Novell NetWare Server 4.x on your system.
- 2 Copy the AMD ODI Server driver (PCNTNW.LAN) from the AMD NetWare driver diskette to the hard disk directory where the NetWare 4.x system files are located. The following path should be used to access the files from the AMD NetWare driver diskette:

A:\NOVELL\SERVER\4.x\PCNTNW.LAN

- 3 Boot NetWare by executing SERVER.EXE. Refer to the appropriate *Novell NetWare* documentation on loading disk drivers and mounting volumes for more information.
- 4 To load the driver manually, follow either step 4.1 (for a PCnet-ISA Adapter Card) or step 4.2 (for PCnet-ISA+, PCnet-ISA II, PCnet-32, PCnet-PCI, and PCnet-FAST Adapter Cards). If you want to load the driver using the AUTOEXEC.NCF file, go to step 5.

Notes: 1) You will need to specify the DOS path if the driver is located in a DOS partition.

2) Make sure the MSM.NLM and ETHERTSM.NLM files are present in the same directory as the PCNTNW.LAN file. These files should be copied from the AMD NetWare support files driver diskette from the 4.x subdirectory under the Novell directory. You must use the latest versions of these files provided in the AMD diskette.

4.1 To manually load the driver for a PCnet-ISA adapter card:

- a. Type the following command at the file server console (which also changes the default settings for PCnet-ISA adapter cards):

```
LOAD C:\PCNTNW PORT=320 INT=5 DMA=7 FASTISA
```

The PORT, INT, and DMA values used above *must* correspond to the PCnet-ISA adapter card's jumper settings.

Note: *IOP, IRQ, and DRQ are older keywords previously used in place of PORT, INT, and DMA, respectively. However, they are not supported starting from Release 4.0.*

- b. Next, bind the driver to the IPX protocol stack by typing:

```
BIND IPX TO PCNTNW NET=xxxx  
(Bind to IPX or any other protocol stack; where e.g., xxxx=1234)
```

- c. Then press <Enter>.

The installation of the NetWare Server 4.x driver is now complete.

4.2 To manually load the driver for PCnet-ISA+, PCnet-ISA II, PCnet-32, PCnet-PCI, and PCnet-FAST adapter cards:

- a. Type the following command at the file server console:

```
LOAD C:\PCNTNW
```

- b. Then press <Enter>.

- c. Next, bind the driver to the IPX protocol stack by typing:

```
BIND IPX TO PCNTNW NET=xxxx  
(Bind to IPX or any other protocol stack; where e.g., xxxx=1234)
```

- d. Then press <Enter>.

The installation of the NetWare Server 4.x driver is now complete.

5. To load the driver using the AUTOEXEC.NCF file, you must first edit the AUTOEXEC.NCF file.

Note: *You will need to specify the DOS path if the driver is located in a DOS partition.*

- a. Type LOAD INSTALL at the server prompt (:) to access the AMINSTAL utility.

- b. Open the MAINTENANCE/SELECTIVE INSTALL menu and select the NCF File Options from the menu to access EDIT AUTOEXEC.
- c. Then add the following command lines to the AUTOEXEC.NCF file.

The following is a PCnet-ISA adapter card example:

```
LOAD C:\PCNTNW DMA=5 INT=3 PORT=320 FRAME=Ethernet_802.2
```

```
BIND IPX TO PCNTNW NET=xxxx  
(Bind to IPX or any other protocol stack; where e.g., xxxx=1234)
```

Note: IOP, IRQ, and DRQ are older keywords previously used in place of PORT, INT, and DMA, respectively. They are still supported in order to be backward compatible.

The installation of the NetWare Server 4.x driver is now complete.

5.5.1. Keyword Examples

5.5.1.1. **BUSTYPE**

Note: Only applies to drivers before Release 3.2. Starting from Release 4.0, BUSTYPE keyword is no longer supported. Use Novell standard keyword, SLOT.

If the bus type is known for the PCnet adapter card installed in the system, the BUSTYPE keyword may be used with the LOAD command. If the BUSTYPE keyword is specified, then the driver will not scan other buses. The available bus types are:

Bus Type	PCnet Adapter Card	Keyword (before 3.2)	Keyword (after 4.0)
ISA	PCnet-ISA	ISA	ISA
ISA Plug and Play (PnP)	PCnet-ISA+, PCnet-ISA II	PNP	
VESA Local Bus (VL)	PCnet-32	VESA	VESA
PCI Local Bus	PCnet-PCI, PCnet-PCI II, PCnet-FAST,	PCI/PCI1/PCI2	PCI

Examples:

	Before 3.2 Release	After 4.0 Release
For PCnet-ISA:	LOAD PCNTNW BUSTYPE=ISA	LOAD PCNTNW ISA
For PCnet-ISA+/PCnet-ISA II:	LOAD PCNTNW BUSTYPE=PNP	LOAD PCNTNW
For PCnet-32:	LOAD PCNTNW BUSTYPE=VESA	LOAD PCNTNW VESA
For PCnet-PCI:	LOAD PCNTNW BUSTYPE=PCI	LOAD PCNTNW PCI

For PCnet-PCI:

LOAD PCNTNW BUSTYPE=PCI1

LOAD PCNTNW PCI

For PCnet-PCI:

LOAD PCNTNW BUSTYPE=PCI2

LOAD PCNTNW PCI

For PCnet-FAST:

LOAD PCNTNW PCI

Note: If the PCI Configuration Access mechanism is known for the PCI system, the user may use PCI1 or PCI2 with the BUSTYPE keyword. However, using PCI with the BUSTYPE keyword will cause the driver to attempt to determine the proper mechanism in the PCI system.

5.5.1.2. FRAME (Multiple Frame Type Support)

The FRAME keyword should be used with the LOAD command to designate the desired frame type. In addition, to supporting multiple FRAME types, the BOARD keyword must be used in conjunction with the FRAME keyword if no IO Address is specified. The available FRAME values are the following:

```
Ethernet_802.2  
Ethernet_802.3  
Ethernet_SNAP  
Ethernet_II
```

Refer to the appropriate *Novell NetWare* documentation for details regarding each frame type. The user designates the BOARD keyword value. The range available for BOARD is 0-254.

```
LOAD PCNTNW FRAME=Ethernet_802.2 BOARD=1  
LOAD PCNTNW FRAME=Ethernet_802.3 BOARD=1  
LOAD PCNTNW FRAME=Ethernet_II BOARD=1  
LOAD PCNTNW FRAME=Ethernet_SNAP BOARD=1
```

Then press <Enter>.

Finally, the driver must be binded to the IPX protocol for each frame type based on the procedure provided in the *Novell NetWare* documentation. Note that if memory is low to support multiple frames, the buffer size must be increased in the STARTUP.NCF file in NetWare. For example, the SET RESERVED BUFFERS below 16 MBytes should be set to 32 from the default setting of 16. For example:

```
Set Reserved Buffers below 16 Meg=32
```

5.5.1.3. FRAME (Single Frame Type Support)

The FRAME keyword should be used with the LOAD command to designate the desired frame type. For single FRAME support, no BOARD keyword is needed to designate one frame type. The available values and description to load FRAME types is explained above in the *Multiple Frame Type Support* section.

5.5.1.4. Loading Multiple PCnet Adapter Cards

The driver must be loaded again for each new PCnet adapter board installed in the system. For example, to load three PCnet-ISA+, PCnet-32, or PCnet-PCI

adapter cards in the system for the Novell NetWare environment, the following must be entered.

First PCnet Adapter Card:	LOAD PCNTNW	SLOT=10001
Second PCnet Adapter Card:	LOAD PCNTNW	SLOT=10002
Third PCnet Adapter Card:	LOAD PCNTNW	SLOT=10003

Then press <Enter>.

If more than one PCnet-ISA adapter card will be installed, the user must specify the IRQ and DMA channel for each card. For example, to load two PCnet-ISA adapter cards:

PCnet-ISA Adapter Card 1:	LOAD PCNTNW DMA=5 INT=3
PCnet-ISA Adapter Card 2:	LOAD PCNTNW DMA=6 INT=5

Then press <Enter>.

5.5.1.5. BOARD

Note: There is no BOARD keyword after Release 4.0.

The BOARD keyword may be used with the LOAD command to specify the board number to the selected physical adapter board. This keyword is used to load a different frame type to the same board. See the *Multiple Frame Type Support* section above for examples using the BOARD keyword.

Note: If PORT and IO Port Address are specified, then the BOARD keyword should not be used.
In this case, the same PORT should be used to load a different frame type.

5.5.1.6. FDUP (PCnet-ISA II, PCnet-PCI-II)

The PCnet-ISA II adapter card provides full duplex operation. For example:

Enable full duplex on 10BaseT port:	Load PCNTNW FDUP = UTP
Enable full duplex on AUI port:	Load PCNTNW FDUP = AUI
Disable full duplex:	Load PCNTNW FDUP = OFF

Note: If FDUP = AUI then the TP (Twisted Pair) keyword is void.

5.5.1.7. CDCOFF (PCnet-PCI)

Note: There is no CDCOFF keyword after Release 4.0.

The CDCOFF keyword will disable the write buffers on the Intel CDC chip. For example:

```
BUSTYPE=PCI CDCOFF
```

- Note:**
1. The driver for IntraNetWare Client32 is identical to that for NetWare Server 4.x.
 2. Refer to IntraNetWare Installation Manual for the Client32 Installation.
 3. Keywords for Client32 are identical to those of NetWare Server 4.x.

5.5.1.8. LineSpeed

The LineSpeed keyword is used to force the line to a special speed and duplex mode.
For example:

```
LOAD PCNTNW 100F
```

5.5.1.9. MPMODE

The MPMODE keyword is used to set up Magic Packet mode.
For example:

```
LOAD PCNTNW MPMODE=ON
```

5.5.1.10. Primary/Secondary

The Primary/Secondary keywords are used to set a pair of adapters Fail-Over mode.
For example:

```
LOAD PCNTNW PRIMARY=10001     SECONDARY=10002
```

5.5.1.11. SCAN

The SCAN keyword is used to switch back to the Primary adapter after Primary adapter Fail-Over and hot swap.
For example:

```
LOAD PCNTNW SCAN
```

5.6. Novell NetWare Operating System Keywords

Keywords for Novell NetWare DOS and OS/2 ODI client drivers and Server drivers are shown in Tables 1 and 2, respectively.

Table 1. Novell NetWare DOS and OS/2 ODI Client Keywords

Keyword Description	Keyword Name	Additional Keyword Details	Range	Default
I/O Address	PORT IOP	See Common Keywords.		
Interrupt	INT IRQ	See Common Keywords.		
DMA	DMA DRQ	See Common Keywords.		
FASTISA	FASTISA <small>* Not supported with OS/2 ODI</small>	FASTISA is a mode that increases the performance of the PCnet-ISA, PCnet-ISA+, and PCnet-ISA II by reducing the memory write cycle time from 450 ns to 350 ns. Some older machines with slower memory may not be compatible, if they do not have an EISA mode. Refer to Appendix A for more details on NET.CFG options.	Present or Not Present	Not Present
Ethernet Frame type	FRAME	See Ethernet Frame type from the IEEE Specification.	Ethernet_802.2 Ethernet_802.3 Ethernet_SNAP Ethernet_II	Ethernet_802.2 (NetWare 3.12, 4.x) Ethernet_802.3 (NetWare 3.11)
Bus Timer Off	BTO <small>* Not supported with OS/2 ODI</small>	BTO will reset bit 13 in CSR4 of the PCnet device to enable the Bus Timer register (CSR82). By default the timer is always on.	Present or Not Present	Not Present

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Keyword Description	Keyword Name	Additional Keyword Details	Range	Default
Full Duplex	FDUP * Supported on PCnet-ISA II only	FDUP keyword is used to enable or disable full duplex on the 10BaseT and AUI ports. See Common Keywords.	UTP AUI OFF	Not Present (What is in EEPROM)
Disable write buffers (CDC chip)	CDCOFF * Not supported with OS/2 ODI	CDCOFF keyword is used to disable the write buffers on the Intel CDC chip.	Present or Not Present	Not Present
MII Mode (Line Speed and Duplex)	LineSpeed	LineSpeed keyword is used to force line to a special speed and duplex mode.	100F 100H 10F 10H Auto	Auto Negotiation

Note: All of the keywords available to the Novell ODI client drivers may be automatically activated by creating or modifying the NET.CFG file. See Appendix A for sample NET.CFG files.

Table 2. Novell NetWare Server Keywords

Keyword Description	Keyword Name	Additional Keyword Details	Range	Default
I/O Address	PORT IOP	See Common Keywords.		
Interrupt	INT IRQ	See Common Keywords.		
DMA	DMA DRQ	See Common Keywords.		
FASTISA	FASTISA	FASTISA is a mode that increases the performance of the PCnet-ISA, PCnet-ISA+, and PCnet-ISA II by reducing the memory write cycle time from 450 ns to 350 ns. Some older machines with slower memory may not be compatible if they do not have an EISA mode. Refer to Appendix A for more details on NET.CFG options.	Present or Not Present	Not Present
Ethernet Frame type	FRAME	See Ethernet Frame type from the IEEE Specification.	Ethernet_802.2 Ethernet_802.3 Ethernet_SNAP Ethernet_II	Ethernet_802.2 (NetWare 3.12, 4.x) Ethernet_802.3 (NetWare 3.11)
Physical Board Number	BOARD	Specifies the physical board number. (Used before 3.2 release)	0-254	255 (No BOARD keyword specified)
Name of Logical Board Number	NAME	Used to identify the logical board for different FRAME types	Any ASCII characters	None
Bus Timer Off	BTO	BTO will reset bit 13 in CSR4 of the PCnet device to disable the Bus Timer register (CSR82). By default the timer is always on.	Present or Not Present	Not Present

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Keyword Description	Keyword Name	Additional Keyword Details	Range	Default
Full Duplex	FDUP * Supported on PCnet-ISA II only	FDUP keyword is used to enable or disable full duplex on the 10BaseT and AUI ports. See Common Keywords.	UTP AUI OFF	Not Present (What is in EEPROM)
Disable write buffers (CDC chip)	CDCOFF * Not supported with OS/2 ODI	CDCOFF keyword is used to disable the write buffers on the Intel CDC chip. (Used before 3.2 release)	Present or Not Present	Not Present
PCI Bus Type	PCI	PCI is used with PCnet-PCI, PCnet-PCI-II, and PCnet-FAST.	Present or Not Present	Not Present
ISA Bus Type	ISA	ISA is used with PCnet-ISA, PCnet-ISA+, and PCnet-II.	Present or Not Present	Not Present
VESA Bus Type	VESA	VESA is used with PCnet-32.	Present or Not Present	Not Present
Slot Number	Slot	Slot keyword is used with the LOAD command to specify the slot number to selected physical adapter board.	Number of Slot	Not Present
MII Mode (Line Speed and Duplex)	LineSpeed	LineSpeed keyword is used to force the line to a special speed and duplex mode.	100F 100H 10F 10H Auto	Auto Negotiation
Magic Packet	MPMode	MPMODE is used to set Magic Packet mode.	On Off	Not Present
LED Light Setting	LEDx	LEDx keyword is used to program the adapter's LEDs.	For Values see User's Guide	Not Present
PermaNet (Fail-Over)	Primary/ Secondary	Primary/Secondary keywords are used to set a pair of adapters to Fail-Over mode.	Number of slot	Not Present
Switch back to the Primary adapter	SCAN	SCAN keyword is used to switch back to the Primary adapter after Primary adapter Fail-Over and hot-swap.	Present or Not Present	Not Present

6. Installing the NDIS 2.01 Driver

The Network Driver Interface Specification (NDIS) 2.01 is a driver specification developed by Microsoft to offer a standard driver interface for adapter cards. AMD's NDIS 2.01 driver supports the following environments:

- Microsoft LAN Manager 2.x
- Microsoft Windows for Workgroups 3.1
- Microsoft Windows for Workgroups 3.11
- IBM LAN Server 2.0, 3.x, 4.x
- SunSoft PC-NFS 5.x
- Artisoft LANtastic 6.0
- Banyan VINES

AMD's NDIS 2.01 driver may be installed using the automated AMINSTAL utility or manually from the command line prompt for each specific environment. Both methods are described below.

6.1. Driver Installation Using the AMINSTAL Utility

To install a driver using the AMINSTAL Utility, follow the steps listed below:

- 1 Run the AMINSTAL Utility to configure your PCnet adapter card's I/O base address, IRQ channel, and DMA channel.

See the AMINSTAL Utility section for more information on configuring your PCnet adapter card.

Once you have completed the configuration of your PCnet adapter card using AMINSTAL, go to step 2 below to continue.

- 2 Select the Continue button in the Configuration dialog box. The Installation dialog box will appear.
- 3 Select the desired PCnet adapter card by highlighting it in the top of the dialog box.

Note: If IBM LAN Manager, Microsoft Windows for Workgroups, SunSoft PC-NFS, etc., OEM installation procedures are used to install the NDIS 2.01 driver, then do not use AMINSTAL to install the NDIS 2.01 driver.

- 4 Highlight the NDIS 2.01 driver to install the driver. Change the default path if necessary. The default directory is C:\NDIS.
- 5 Press the Continue button to complete the installation. AMINSTAL will copy the selected driver file into the specified directory, create a PROTOCOL.INI file in the specified directory, and copy a sample

CONFIG.NET file into the specified directory.

The CONFIG.NET file contains the following:

```
DEVICE=<install path> PROTMAN.DOS /I:<install path>
DEVICE=<install path> PCNTND.DOS
```

Note: *PROTMAN.DOS is distributed by Microsoft, IBM, and other operating system companies.*

- 6 Exit the AMINSTAL utility when the installation has been completed. The user may need to make modifications to the system files, using the AMD sample files as reference.

The installation of the NDIS 2.01 driver is now complete.

6.2. Microsoft LAN Manager

Support is provided for the Microsoft LAN Manager (Version 2.x) environment. The driver should be installed using the Microsoft LAN Manager Setup Utility.

- Notes:**
- 1) The hardware for the Microsoft LAN Manager environment can be configured to run as an OS/2 server, OS/2 workstation, basic MS-DOS workstation, or an enhanced MS-DOS workstation. Refer to your Microsoft LAN Manager documentation as needed.
 - 2) The directory structure provided on the AMD NDIS 2.01 driver diskette has been setup for automatic OEM installation. The OEM Installation section of this manual provides more details regarding OEM driver installation. Also, more information can be found in the Microsoft LAN Manager Installation Guide.

6.2.1. Driver Installation Using Microsoft LAN Manager Setup Utility

The installation procedure described below assumes the Microsoft LAN Manager has already been installed. If not, refer to the Microsoft LAN Manager Installation Guide for installation instructions.

To install a driver using the Microsoft LAN Manager Setup Utility, follow the steps listed below:

- __1 Insert the AMD NDIS 2.01 driver diskette into the floppy drive.

Note: Two information files (*pcntnd.nif* and *protocol.ini*) will be used for driver installation. These files are located on the AMD NDIS 2.01 driver diskette.

- __2 Change to the LAN Manager subdirectory on your hard disk by typing:

```
cd C:\LANMAN
```

Then press <Enter>.

- __3 Next start the Microsoft LAN Manager Setup utility by typing:

```
setup
```

Then press <Enter>. The following message will be displayed:

```
Loading Microsoft LAN Manager configuration ...
```

- __4 Hold down the <Alt> key and press C to access the Configuration drop-down menu.
- __5 Use the up/down arrow keys to select Network Drivers... and then press <Enter>. This will open the Workstation Configuration window.
- __6 If you have an existing (old) PCnet Family Ethernet driver installed, use the tab key to select Remove Config and then press <Enter>. This removes the existing PCnet driver.

- __7 Use the tab key to select Add New Config and then press <Enter>. This will open the Network Adapter Drivers window.
- __8 Use the tab key to select Other Driver and then press <Enter>.
- __9 Enter the disk drive letter (e.g., A:) where the AMD NDIS 2.01 driver diskette is located.

Note: *No path is required since the AMD diskette is structured for the Microsoft LAN Manager OEM setup.*

Use the tab key to select OK and then press <Enter>.

- __10 Use the up/down arrow keys to select PCnet Family Ethernet Adapter. Next, use the tab key to select OK and then press <Enter>.

Note: *If you have older PCnet Family drivers installed, you will be asked if you want to Overwrite? Use the tab key to select <Yes> and then press <Enter>.*

The following message will be displayed:

Copying drivers, please wait ...

Wait for the message to go away.

- __11 Use the up/down arrow keys to select the desired protocol, press the spacebar to select, and then use the tab key to select OK. Then press <Enter>. You will then be returned to the Workstation Configuration window.
- __12 Use the tab key to select Save and then press <Enter>. The following message will be displayed:

Saving Microsoft LAN Manager Configuration ...

Wait for the message to go away.

- __13 Hold down the <Alt> key and press L to access the LAN Manager drop-down menu.
- __14 Use the up/down arrow keys to select Exit Setup and then press <Enter>. The following message will be displayed:

LAN Manager Configuration Complete

OK will be highlighted. Press <Enter>.

The installation of the NDIS 2.01 driver for Microsoft LAN Manager is now

Installing the NDIS 2.01 Driver

complete.

6.2.2. File Examples

During installation, LAN Manager will automatically make modifications to the CONFIG.SYS, AUTOEXEC.BAT, and PROTOCOL.INI files. Below are sample files for a PCnet-ISA adapter card.

CONFIG.SYS

```
DEVICE=C:\LANMAN.DOS\DRIVERS\PROTMAN\PROTMAN.DOS /i:C:\LANMAN.DOS
DEVICE=C:\LANMAN.DOS\DRIVERS\ETHERNET\PCNET\PCNTND.DOS
```

AUTOEXEC.BAT

```
SET PATH=C:\LANMAN.DOS\NETPROG;%PATH%
NET START WORKSTATION
LOAD NETBEUI
NET LOGON bill.gates
```

PROTOCOL.INI

```
[PROTMAN]
  DRIVERNAME = PROTMAN$
  DYNAMIC = YES
  PRIORITY = NETBEUI

[NETBEUI_XIF]
  Drivername = netbeui$
  SESSIONS = 6
  NCBS = 12
  BINDINGS = PCNTND_NIF
  LANABASE = 0

[PCNTND_NIF]
;-----;
; AMD PCnet Ethernet Adapter ;
;-----;

  DriverName = PCNTND$
  IOAddress = 0x0300
  Interrupt = 4
  DMAChannel = 5
```

Note: For PCnet-ISA adapter cards, be sure the *IOAddress*, *Interrupt*, and the *DMA Channel* match the card's jumper settings. For other PCnet adapter cards, the user can leave out these keyword parameters.

6.2.3. Keyword Examples

To change the transmit and receive buffers, insert the following statements in the PROTOCOL.INI file (located in the PCnet Driver (PCNTND) directory):

```
RXBUFFERS = 4  
TXBUFFERS = 4
```

To use the BUSTYPE keyword, remove the I/O Address and insert the BUSTYPE keyword in the PROTOCOL.INI file (located in the PCnet Driver (PCNTND) directory). For example, to designate the PCnet-32 adapter card and the VL bus, insert the following:

```
BUSTYPE = VESA
```

6.3. Microsoft Windows for Workgroups 3.1

Support is provided for the Microsoft Windows for Workgroups (Version 3.1) environment.

- Notes:**
- 1) *The format and procedure to install the NDIS drivers for Windows for Workgroups 3.1 is different from that of Windows for Workgroups 3.11. Refer to Section 6.4 for the procedure for Windows for Workgroups 3.11.*
 - 2) *The directory structure that is provided on the AMD NDIS 2.01 driver diskette has been set up for automatic OEM installation. The OEM Installation section of this manual provides more details regarding OEM driver installation. Also, more information can be found in the Microsoft Windows for Workgroups 3.1 User's Guide.*

Follow the steps listed below:

- __1 Insert the AMD NDIS 2.01 driver diskette in the floppy drive.
- __2 From the Main menu in Windows, select the Control Panel icon.
- __3 In the Network Setting dialog box, select the Adapters button. The Network Adapters dialog box should appear.
- __4 Choose the Add button to install the PCnet driver from the AMD NDIS 2.01 driver diskette.
- __5 In the list of network adapters, select the Unlisted or Updated Network Adapter. Then enter the path to load the NDIS 2.01 driver (e.g., A:\WFW31).
- __7 Select the AMD PCnet Family Driver and choose OK.
- __8 If the network adapter driver requires additional settings, a Setup dialog box appears displaying the default settings.

__8.1 For a PCnet-ISA adapter card:

The dialog box will appear and the default settings will show IRQ = 3 and DMA =5 . Use the Advanced button option for additional settings such as the DMA channel setting. Make any modifications to the settings to correspond with the jumper settings on your PCnet-ISA adapter card.

__8.2 For PCnet-ISA+, PCnet-ISA II, PCnet-32, and PCnet-PCI adapter cards:

No settings need to be specified for one installed adapter.

- 9 In the Network Adapters dialog box, choose the Close button. Then choose the OK button in the Network Settings dialog box.
- 10 Follow the remaining Window instructions. Restart the computer to have the driver installation take effect.

The installation of the NDIS 2.01 driver for Windows for Workgroups is now complete.

6.3.1. Keyword Example

To set the IRQ channel value for the PCnet-ISA adapter card, choose the Network icon to select the Adapters button. Then, choose the AMD PCnet adapter card to modify the card's settings. In the Setup dialog box, select (or enter) the IRQ (interrupt channel) desired to match the corresponding jumper setting on your PCnet-ISA adapter card.

6.4. Microsoft Windows for Workgroups 3.11

Support is provided for the Microsoft Windows for Workgroups (Version 3.11) environment. Microsoft Windows for Workgroups 3.11 supports both NDIS 2.01 and NDIS 3.x drivers. AMD provides both of these NDIS drivers.

- Notes:**
- 1) *The format and procedure to install the NDIS drivers for Windows for Workgroups 3.11 is different from that of Windows for Workgroups 3.1. Refer to Section 6.3 for the procedure for Windows for Workgroups 3.1.*
 - 2) *The directory structure that is provided on the AMD NDIS 2.01 driver diskette has been setup for automatic OEM installation. The OEM Installation section of this manual provides more details regarding OEM driver installation. Also, more information can be found in the Microsoft Windows for Workgroups 3.11 User's Guide.*

Follow the steps listed below:

- __1 Insert the AMD NDIS 2.01 driver diskette into the floppy drive.
- __2 In the Windows for Workgroups 3.11 Program Manager, double click on the Windows Setup icon.
- __3 From the Options Menu, select Change Network Settings.
- __4 From the Network Setup dialog box, select the Drivers... button to install the PCnet NDIS 2.01 and NDIS 3.x drivers.
- __5 In the Network Drivers dialog box, select the Add Adapter button to install the PCnet device drivers.
- __6 In the Add Network Adapter window, choose the Unlisted or Updated Network Adapter from the menu and then select OK .

Note: *The Detect button, the Am2100/Am1500T, or the PCnet Family selections from the menu of standard drivers uses a previous release of the AMD driver software.*

- __7 The Install Driver dialog box will appear. Enter the floppy drive containing the AMD NDIS 2.01 driver diskette and specify the Windows for Workgroups 3.11 path and the path for \PCI or \ISA, depending on which network interface card you are using to install the PCnet drivers. For example, enter:

A:\WFW311\ISA or \PCI

Then select OK.

- __8 The Advanced Micro Devices PCnet Family selection will appear under the Network Adapters list. Select OK to continue.

- 9 Answer the series of questions for the correct base I/O port, IRQ channel, and DMA channel if you are using an ISA card. In the Network Drivers dialog box, select Setup. If you are using a PCnet PCI device and would like to load the NDIS 2 driver, go to step 9.3. If loading the NDIS 3 driver, go to step 10.

—9.1 For a PCnet-ISA adapter card:

Specify the IRQ, base I/O port, and DMA channel to correspond to the jumper settings on the adapter card.

—9.2 For PCnet-ISA+, PCnet-ISA II, PCnet-32, and PCnet-PCI adapter cards

- a. Set interrupt (IRQ) to Auto_scan and the base I/O port to 0.
- b. Select OK. In the Network Drivers dialog box, select Close. In the Network Setup dialog box, select OK. For the Microsoft-specific dialog boxes, select Skip. For the Install Driver dialog box, enter:

\WFW311\ISA or \PCI

Note: If Auto_scan is selected for PCnet-ISA+, PCnet-ISA II, PCnet-32, or PCnet-PCI, then no value need be specified; however, Windows for Workgroups 3.11 will issue a warning message regarding possible interrupt conflict. This is due to the temporary configuring of the interrupt to channel 0 until the real value is set according to the EEPROM configuration.

- 9.3 Highlight the Advanced Micro Devices PCnet adapter (NDIS2/NDIS3) and click on the Setup option on the right side of the screen.
- 9.4 Click the pull-down bar under Driver Type, highlight the Real Mode NDIS Driver option, and click OK.
- 9.5 A window will appear warning you about a possible interrupt conflict and it asks you if you want to change the setting. Click No, then go to step 10.
- 10 Select OK to exit. Windows for Workgroups 3.11 will ask the user to reboot the machine once the installation is completed.

The installation of the NDIS 2.01 driver for Windows for Workgroups 3.11 is now complete.

6.4.1. Keyword Example

To set the LED0 keyword value, follow the instructions given above to access the advanced settings for a PCnet adapter card. A dialog box will appear to set the LED keyword options. In the LED0 setting, enter the value desired from the list given in the *Software Keywords* section (Appendix B).

6.5. Microsoft Windows 95

This installation assumes that there is a PCnet controller and driver installed in the system and that this is an upgrade.

To install the driver from the distribution floppy, follow these directions:

- __1 Click on Start, choose settings, and click on Control Panel.
- __2 Double click on the Network icon. Highlight the network driver and remove the already installed network adapter.
- __3 Click Add and select adapter, and click once again. Select the Have Disk option and specify the path: A:\Win95 and click OK.
- __4 Choose the correct adapter from the list on the screen. Click OK.
- __5 Highlight the driver you selected and click on properties. Select the Real Mode (16 bit) NDIS driver and click OK. Click OK again. Insert the PCnet Family driver Disk 2, which contains the NDIS2 driver. Type the path:
A:\MSLANMAN.DOS\drivers\ethernet\pcntnd and click OK.
- __6 Before you restart your computer make sure that you add the real mode protocol which you would like to use, such as Microsoft DLC protocol.
- __7 On completion, shut down the system and reboot. The NDIS2 driver should be up and running now.

6.6. IBM LAN Server

AMD's NDIS 2.01 driver can also be used with the IBM LAN Server (Version 2.x, 3.x, and 4.x) environment. IBM LAN Server requires a unique NIF file. This NIF file is included on the AMD NDIS 2.01 driver diskette (see the README.TXT file under the IBMCOM directory).

Note: *The directory structure provided on the AMD SCO Unix driver diskette has been setup for automatic OEM installation. The OEM Installation section of this manual provides more details regarding OEM driver installation. Also, more information can be found in the IBM LAN Adapter and Protocol Support Configuration Guide.*

Follow the steps listed below:

- __1 Insert the AMD NDIS 2.01 driver diskette into the floppy drive.
- __2 In IBM LAN Server, select or run the LAPS (LAN Adapter and Protocol Support) program. Refer to the *IBM LAN Adapter and Protocol Support Configuration Guide* for more information on this utility and for more details on how to install additional adapters and device drivers.
- __3 From the IBM LAPS dialog box, choose the INSTALL button to install a PCnet Network adapter card for the IBM LAN Server environment. If the PCnet adapter card has already been installed, go to step 6 below to continue.
- __4 Specify the drive and path (e.g., `LANSRVR`) to the AMD NDIS 2.01 driver diskette (e.g., `A:\LANSRVR`).
- __5 After installing/copying the appropriate NIF files from the AMD NDIS 2.01 driver diskette, the IBM LAPS dialog box will appear again.
- __6 From the IBM LAPS dialog box, select Configure.
- __7 In the Configuration dialog box, choose the Configure LAN transports (default) option and select Continue.
- __8 When the Configure Workstation dialog box is displayed, remove the current configurations from the Current Configuration list box.
- __9 Choose the AMD PCnet Family Ethernet Adapter from the Network Adapters list box, by highlighting the entry. Then choose Add to add the AMD PCnet adapter card to the Current Configuration list box.
- __10 Highlight the appropriate protocols in the Protocols list box. Then choose Add to add them to the Current Configuration list box.
- __11 Choose the AMD PCnet adapter from the Current Configuration list box. Then

choose Edit. The Parameters for AMD dialog box is displayed.

- __12 View the default configuration. If the default configuration is OK, choose OK.

If you need to change the AMD configuration, change the options in this dialog box. Choose Range to display the available settings for each option. Press [F1] if you need help deciding on a setting.

- __12.1 For a PCnet-ISA adapter card:

Make all modifications necessary to match the jumper settings on the PCnet-ISA adapter card.

- __12.2 For PCnet-ISA+, PCnet-ISA II, PCnet-32, and PCnet-PCI Adapter cards:

No settings need to be specified since they are software configurable.

The installation of the NDIS 2.01 driver for IBM LAN Server is now complete.

6.6.1. Driver Installation For IBM Extended Services 1.0

Follow the steps listed below:

- __1 Insert the AMD NDIS 2.01 driver diskette into the floppy drive.
- __2 Display the Communication Manager main menu and choose Advanced.
- __3 Choose Configuration.
- __4 Choose LAN Adapter and Protocol Support (LAPS).
- __5 At the Options dialog box, choose Copy additional network adapter drivers. Then choose OK.
- __6 At the Copy Additional Network Adapter Drivers dialog box, type the path (e.g., A:). Then choose OK.
- __7 When the Copy Diskette dialog box is displayed, choose OK.
- __8 When the Options dialog box is displayed, choose Configure Workstation. Then choose OK.
- __9 When the Configure Workstation dialog box is displayed, remove the current configurations from the Current Configuration list box.

- __10 Choose the AMD PCnet Family Ethernet Adapter from the Network Adapters list box, by highlighting the entry. Then choose Add to add the AMD adapter to Current Configuration list box.
- __11 Highlight the appropriate protocols in the Protocols list box. Then choose Add to add them to the Current Configuration list box.
- __12 Choose the AMD PCnet Adapter at the Current Configuration list box. Then choose Edit. The Parameters for AMD dialog box is displayed.
- __13 View the default configuration. If the default configuration is OK, choose OK.

If you need to change the AMD configuration, change the options in this dialog box. Choose Range to display the available settings for each option. Press [F1] if you need help deciding on a setting.

__13.1 For a PCnet-ISA adapter card:

Make all modifications necessary to match the jumper settings on the PCnet-ISA adapter card.

__13.2 For PCnet-ISA+, PCnet-ISA II, PCnet-32, and PCnet-PCI adapter Cards

No settings need to be specified since they are software configurable.

The installation of the NDIS 2.01 driver for IBM Extended Services 1.0 (LAN Server) is now complete.

6.6.2. Driver Installation For IBM LAN Server 4.x (DOS Client)

To support DOS client packages for IBM LAN Server 4.x, two new directories have been added on diskette 6. The first directory, \IBMLSP, should be used as a path for the Advanced LAN Support Program. The second directory, \IBMADOS, should be used as a path for the Advanced LAN DOS Services package.

6.7. SunSoft PC-NFS

The AMD NDIS 2.01 driver can also be used with the SunSoft PC-NFS (version 5.x) environment.

Note: *The directory structure provided on the AMD PC-NFS driver diskette has been set up for automatic OEM installation. Also, more information can be found in the SunSoft PC-NFS Manuals.*

Follow the steps listed below:

- __1 Be sure PC-NFS is installed on your system and configured for an NDIS 2.01 driver. See the *PC-NFS Installation Procedure Manuals* for more information.
- __2 Run NFSCONF. Select Adapter Menu. Select Ethernet. Select NDIS.
- __3 Insert the PC-NFS QUIKNDIS diskette into the floppy drive. Change to the drive containing the QUIKNDIS diskette (e.g., A:\).
- __4 At the prompt type:

QUIKNDIS

Then press <Enter>.

- __5 A message will appear asking for the current boot drive. Enter the current boot drive and then press <Enter>.
- __6 Press Y to save the current PROTOCOL.INI file as PROTOCOL.OLD. Ignore this step if this dialog box does not appear.
- __7 In the Adapter Card List box, select the Custom option to install the PCnet NDIS driver for PC-NFS.
- __8 Remove the QUIKNDIS disk from the floppy drive. Insert the AMD NDIS 2.01 driver diskette into the floppy drive.
- __9 Follow the dialog boxes and enter the correct driver and path on the AMD NDIS 2.01 driver diskette to install the NDIS driver (e.g., A:\PCNFS).
- __10 Enter PCNTND for the NIF file name and then press <Enter>.
- __11 Make the appropriate changes to the CONFIG.SYS and AUTOEXEC.BAT files.
- __12 Reboot your system.

The installation of the NDIS 2.01 driver for PC-NFS is now complete.

6.8. Artisoft LANtastic

Support is provided for the Artisoft LANtastic (Version 6.0) environment.

Note: *Artisoft LANtastic 6.0 is now based on the NDIS 2.01 specification.*

In order to install a driver for LANtastic 6.0, the operating system must be re-installed. Start from the DOS system prompt. Follow the steps listed below:

- __1 Insert disk 1 of LANtastic 6.0 into your floppy drive (e.g., A). At the DOS prompt, type:

```
a:\install
```

Then press <Enter>. This starts the LANtastic installation process.

- __2 Artisoft's installation program will then search for Microsoft Windows on your system. If Windows is not found, press <Enter> at the message to run the install program under DOS and go to step 2.1 to continue. Otherwise, if Windows is found, Windows will be started. Go to step 3 to continue.
 - __2.1 Some Artisoft initialization messages will appear on the screen. Press <Enter> to continue.
 - __2.2 Select KEEP all previous LANtastic setup information.
 - __2.3 Select any additional LANtastic features you wish to install (see Artisoft LANtastic Manuals for more information). Press <Enter> to continue.
 - __2.4 Select NDIS Support for Network Adapters.
 - __2.5 Insert the AMD NDIS 2.01 driver diskette (disk 1) into the floppy drive and then press <Enter> to continue.
 - __2.6 Insert the appropriate Artisoft LANtastic 6.0 disk when prompted. Press <Enter> to continue.
 - __2.7 Select OK to perform the installation and press <Enter> to continue.
 - __2.8 Information will appear on the screen, press <Enter> to continue.
 - __2.9 Insert the appropriate Artisoft LANtastic 6.0 disk when prompted. Press <Enter> to continue.
 - __2.10 You will see the Installation complete and Need to reboot your

computer message. Press <Enter> to continue. Remove the disk from the floppy drive. Press <Enter> to reboot.

__ 2.11 On start-up you'll see the message:

```
AMD PCnet Family Ethernet Adapter  
NDIS v2.0.1 MAC Driver, Version x.xx  
Drivername  
Driver configuration information such as IOAddress,  
Interrupt, and DMA
```

__ 2.12 Next, you will see some LANtastic configuration messages.

The installation of the NDIS 2.01 driver for Artisoft LANtastic 6.0 is now complete.

- __ 3 You will see the Artisoft Install message. Click OK to continue.
- __ 4 Select KEEP all previous LANtastic setup information and click OK to continue.
- __ 5 Select any additional LANtastic features you wish to install (see Artisoft LANtastic Manuals for more information). Click OK to continue.
- __ 6 Select NDIS Support for Network Adapters and click OK to continue.
- __ 7 Insert the AMD NDIS 2.01 driver diskette (disk 1) into the floppy drive and then click OK to continue.
- __ 8 Insert the appropriate Artisoft LANtastic 6.0 disk when prompted. Click OK to continue.
- __ 9 Select OK to perform the installation and click OK to continue.
- __ 10 Information will appear on the screen, click OK to continue.
- __ 11 Insert the appropriate Artisoft LANtastic 6.0 disk when prompted. Click OK to continue.
- __ 12 You will see the Installation complete and Need to reboot your computer message. Click OK to continue. Remove the disk from the floppy drive. Click OK to reboot.
- __ 13 On start-up you'll see the message:

```
AMD PCnet Family Ethernet Adapter  
NDIS v2.0.1 MAC Driver, Version x.xx  
Drivername
```

Driver configuration information such as IOAddress, Interrupt, and DMA

—14 Next, you will see some LANtastic configuration messages.

The installation of the NDIS 2.01 driver for Artisoft LANtastic 6.0 is now complete.

6.9. Banyan VINES

AMD's NDIS 2.01 driver may be configured to run in the Banyan VINES environment (for client-based systems only). Follow the steps listed below:

- 1 Compile all the necessary files (see the file list below) for VINES. These files are all located in one subdirectory on the AMD NDIS 2.01 driver diskette (A:\NDIS).
- 2 Create the PROTOCOL.INI, CONFIG.SYS, and AUTOEXEC.BAT files (sample files are shown below).
 - a. Modify the PROTOCOL.INI file to reflect the changes necessary for the appropriate LAN card section.
 - b. Modify the AUTOEXEC.BAT and CONFIG.SYS files to reflect changes in the directory where the files mentioned in step 1 are to be located.
- 3 Run the VINES PCCONFIG Utility to configure the NDIS driver.
- 4 Reboot the machine. The installation of the NDIS 2.01 driver for Banyan VINES is now complete.

6.9.1. Files Required

BAN	EXE	32835	02-12-92	6:07p
BAN	MSB	2058	02-12-92	6:07p
REDIR	MSB	982	02-12-92	6:07p
NEWREV	EXE	47933	02-12-92	6:07p
NEWREV	MSB	5139	02-12-92	6:07p
PCCONFIG	DB	19656	02-12-92	6:07p
REDIRALL	EXE	51546	02-12-92	6:07p
PCCONFIG	EXE	61155	02-12-92	6:07p
PCCONFIG	MSB	5785	02-12-92	6:07p
NDISBAN	COM	35356	02-12-92	6:07p
NETBIND	EXE	15639	02-12-92	6:07p
NDISBAN	DOC	3072	02-12-92	6:07p
NDISBAN	OVL	15639	02-12-92	6:07p
PROTMAN	DOS	10649	02-12-92	6:07p

6.9.2. User Must Create

PROTOCOL	INI	351	05-28-92	11:07a
CONFIG	SYS	226	05-29-92	10:05a
AUTOEXEC	BAT	112	05-28-92	05:25p

PCNTND	DOS			
--------	-----	--	--	--

6.9.3. User Must Find

The following path should be used to access the driver from the AMD NDIS 2.01 driver diskette:

```
A:\MSLANMAN.DOS\DRIVERS\ETHERNET\PCNET
```

The modifications to the CONFIG.SYS, AUTOEXEC.BAT, and PROTOCOL.INI files are shown below as an example for PCnet-ISA adapter cards.

CONFIG.SYS

```
FILES=20
BUFFERS=20
DEVICE=C:\BANYAN\PROTMAN.DOS /I:C:\BANYAN
DEVICE=C:\BANYAN\PCNTND.SYS
```

AUTOEXEC.BAT

```
PATH=C:\DOS
PROMPT $P$G
C:
CD\BANYAN
BAN /nc
ndisban
netbind
redirall
```

PROTOCOL.INI

```
[ PROTOCOL.INI ]
DRIVENAME= PROTMAN$

; PROTOCOL.INI section for the AMD PCnet Card
[ PCNTND_NIF ]
DRIVENAME = PCNTND$
; IOBASE = 0x300
; INTERRUPT = 3
; DMACHANNEL = 5

[VINES_XIF]
DRIVENAME = NDISBAN$
BINDINGS = PCNTND_NIF
```

6.10. DEC Pathworks for DOS/Window V5.1 Installation

The following instructions assume that the DEC Pathworks for DOS/Windows has been installed on the hard drive from the installation diskettes or CD ROM. Refer to the DEC manual for installation instructions if the software has not been installed.

- __1 Go to the drive where Pathworks software is installed.
- __2 Change directory to PCAPP.
- __3 Execute PWSETUP.
- __4 Enter the directory where you want the software installed. The default is c:\PW.
- __5 Choose CUSTOMIZE under the Select a Configuration Option menu.
- __6 Choose appropriate template in the Select a Workstation Template menu.
- __7 Under the Customize: Modify Workstation Configuration menu, put an X mark beside the Network Adapter Information line.
- __8 Additional menus will appear. Choose the appropriate options for your network environment. Refer to the DEC manual for questions regarding these menus.
- __9 Choose <Other Network Adapter> under the Customize: Network Adapter Information menu.
- __10 If installing options other than NetWare, type:
a:\mslanman.dos\drivers\ethernet\pcntnd\pcntnd.dos on the drive file line.
Then type:
a:\mslanman.dos\drivers\ethernet\pcntnd\protocol.ini on the Protocol.ini Stub line.
- __11 Verify that Ethernet is marked and click OK.
- __12 Click OK under the Customize: Network Adapter Information menu.
- __13 Additional menus will appear. Follow the DEC instruction to complete the installation.

6.11. NDIS 2.01 Driver Keywords

See Table 3 for NDIS 2.01 Driver Keywords.

Table 3. NDIS 2.01 Driver Keywords

Keyword Description	Keyword Name	Additional Keyword Details	Range	Default
I/O Address	IOADDRESS PORT IOBASE	See Common Keywords.		
Interrupt	INT, INTERRUPT IRQ	See Common Keywords.		
DMA	DMA DMACHANNEL	See Common Keywords.		
Transmit Buffers	TXBUFFERS	Transmit and Receive buffer sizes may be increased or decreased using Transmit and Receive Buffer keywords. Each network operating system environment has different formats and syntax for interrupt settings. Once again, refer to the OEM manuals for correct format and usage of interrupt settings.	Power of 2	4

Installing the NDIS 2.01 Driver

Keyword Description	Keyword Name	Additional Keyword Details	Range	Default
Maximum Multicasts	MAXMULTICASTS	To designate the maximum number of multicast addresses for the device	N/A	10
Bus type designation	BUS_TO_SCAN	See AMD Driver Specific Keywords		
Net Address	NETADDRESS	This keyword allows the user to specify or overwrite the IEEE or Mfr. address. This must be edited in PROTOCOL.INI or NT registry.	Any valid IEEE address or Not Present	Not Present
Full Duplex	FDUP * Supported on PCnet-ISA II only	FDUP keyword is used to enable or disable full duplex on the 10BaseT and AUI ports. See Common Keywords.	UTP AUI OFF	Not Present (What is on the EEPROM)

Note: All of the keywords available to the NDIS 2.01 driver may be activated by configuring the PROTOCOL.INI file in some operating system environments or by selecting the options through a dialog box in other operating systems.

7. Installing the NDIS 3.x and 4.x Drivers

7.1. Installation of the NDIS 3.x Driver

The Network Driver Interface Specification (NDIS) 3.x is a driver specification developed by Microsoft to offer a standard driver interface for adapter cards. AMD's NDIS 3.x driver supports the following environments:

- Microsoft Windows NT 3.1, 3.5, 3.51
- Microsoft Windows for Workgroups 3.11 and Microsoft Windows 95

Installation of AMD's NDIS 3.x driver for the environments listed above is described below.

7.1.1. Microsoft Windows NT

Support is provided for the Microsoft Windows NT (Versions 3.1, 3.5, and 3.51) environment.

Notes: 1) *The directory structure provided on the AMD NDIS 3.x driver diskette has been set up for automatic OEM installation. Also, more information can be found in the Microsoft Windows NT User's Guide.*
2) *Only x86-based Windows NT platforms are supported.*

Follow the steps listed below:

- __1 Insert the AMD NDIS 3.x driver diskette into the floppy drive.
- __2 From the Control Panel in the Windows NT Main window, double click on the Network icon to install the PCnet adapter card.
- __3 In the Network Settings dialog box, choose Add Adapter.
- __4 In the Add Network Adapter dialog box, pull down the adapter card list menu and select <Other> Requires disk from manufacturer from the list and continue.
- __5 In the next window, enter:

A:\WINNT350
- __6 Then, select AMD PCnet Family Ethernet Adapter from the dialog box to install the AMD PCnet adapter card.

- 7 In the AMD PCnet Family Ethernet Adapter Card Setup dialog box, select bus type All (defaults to All if nothing is selected). If more than one network adapter card is used, select its bus type.

Note: Sometimes All will not work on PCI-based systems. In this case, try selecting PCI1 or PCI2 depending on the bus type.

- 7.1 For a PCnet-ISA adapter card:

Enter the correct I/O port, IRQ, and DMA channel values to correspond with what is set on the card by jumpers. If no values are selected, the default values will be chosen by the AMD driver.

- 7.2 For PCnet-ISA+, PCnet-ISA II, PCnet-32, and PCnet-PCI adapter cards:

IRQ and DMA channel values are auto-detected. However, the values must be specified for multiple network cards. The IRQ and DMA values are set by using the AMINSTAL Utility (see the Express Installation section for more details). Shutdown Windows NT and run the AMINSTAL Utility from DOS.

Note: If you are using a PCnet-PCI adapter card, you do not need to run the AMINSTAL Utility.

- 8 Reboot your system to complete the driver installation process.

For additional information, refer to your Microsoft Windows NT OS documentation. In addition, the user may review the README.TXT file in the WINNT directory of the AMD NDIS 3.x driver diskette.

7.1.1.1. Keyword Example

To set the TP keyword, go into the AMD PCnet Family Ethernet Adapter Card Setup dialog box (see instructions above on how to access this dialog box), activate the TP button to use the TP keyword as described in the *Software Keywords* section (Appendix B).

7.1.2. Microsoft Windows for Workgroups 3.11

Support is provided for the Microsoft Windows for Workgroups (Version 3.11) environment. Microsoft Windows for Workgroups 3.11 supports both NDIS 2.01 and NDIS 3.x drivers. AMD provides both of these NDIS drivers.

- Notes:**
- 1) *The format and procedure to install the NDIS drivers for Windows for Workgroups 3.11 is different from that of Windows for Workgroups 3.1.*
 - 2) *The directory structure that is provided on the AMD NDIS 3.x driver diskette has been setup for automatic OEM installation. The OEM Installation section of this manual provides more details regarding OEM driver installation. Also, more information can be found in the Microsoft Windows for Workgroups 3.11 User's Guide.*

Follow the steps listed below:

- 1 Insert the AMD NDIS 3.x driver diskette into the floppy drive.
- 2 In the Windows for Workgroups 3.11 Program Manager, double click on the Windows Setup icon.
- 3 From the Options Menu, select Change Network Settings.
- 4 From the Network Setup dialog box, select the Drivers... button to install the PCnet NDIS 2.01 and NDIS 3.x drivers.
- 5 In the Network Drivers dialog box, select the Add Adapter button to install the PCnet device drivers.
- 6 In the Add Network Adapter window, choose the Unlisted or Updated Network Adapter from the menu and then select OK.

Note: *The Detect button, the Am2100/Am1500T, or the PCnet Family selections from the menu of standard drivers uses a previous release of the AMD driver software.*

- 7 The Install Driver dialog box will appear. Enter the floppy drive containing the AMD NDIS 3.x driver diskette and specify the Windows for Workgroups 3.11 path to install the PCnet drivers. For example, enter:

A:\WFW311\ISA for ISA cards or
A:\WFW311\PCI for PCI cards

Then select OK.

- 8 The Advanced Micro Devices PCnet Family selection will appear under the Network Adapters list. Select OK to continue.
- 9 Answer the series of questions for the correct base I/O port, IRQ channel, and DMA channel.

In the Network Drivers dialog box, select Setup.

In the AMD PCnet Family dialog box:

__9.1 For a PCnet-ISA adapter card:

Specify the IRQ, base I/O port, and DMA channel to correspond to the jumper settings on the adapter card.

__9.2 For PCnet-ISA+, PCnet-ISA II, PCnet-32, and PCnet-PCI adapter cards:

- a. Set interrupt (IRQ) to Auto_scan and the base I/O port to 0.
- b. Select OK. In the Network Drivers dialog box, select Close. In the Network Setup dialog box, select OK. For the Microsoft-specific dialog boxes, select Skip. For the Install Driver dialog box, enter:

\WFW311

Note: If Auto_scan is selected for PCnet-ISA+, PCnet-ISA II, PCnet-32, or PCnet-PCI, then no value need be specified; however, Windows for Workgroups 3.11 will issue a warning message regarding possible interrupt conflict. This is due to the temporary configuring of the interrupt to channel 0 until the real value is set according to the EEPROM configuration.

__10 Select OK to exit. Windows for Workgroups 3.11 will ask the user to reboot the machine once the installation is completed.

The installation of the NDIS 3.x driver for Windows for Workgroups 3.11 is now complete.

7.1.2.1. Keyword Example

To set the LED0 keyword value, follow the instructions given above to access the advanced settings for a PCnet adapter card. A dialog box will appear to set the LED keyword options. In the LED0 setting, enter the value desired from the list given in the Software Keywords section (Appendix B). See Table 4 for NDIS 3.x Driver Keywords.

7.1.3. Installation of the NDIS 3.x Win 95 Driver

This installation assumes that there is a PCnet controller and driver installed in the system and that this is an upgrade.

To install the driver from the distribution floppy, follow these instructions:

- __1 Click on the Start button, choose Settings, and then choose Control Panel.
- __2 Choose the Network icon from the menu. Then delete the already installed network card.
- __3 From distribution diskette 1, copy the file `Netamd.inf` from `<drive>:\WIN95\MAC\NDIS3` to `c:\WINDOWS\INF`
- __4 Then shut down the system.
- __5 On reboot, Win95 detects the PCnet controller installed in the system and prompts the user for the path of the distribution floppy. For example, `a:\WIN95\MAC\NDIS3`
Note: In case, Win95 does not detect the controller on the system, then skip the following and try the next installation procedure.
- __6 The rest of the network files are copied from the Win95 Distribution disks.
- __7 On completion of the installation, the user will be prompted to Shutdown the system. When the System comes up again, the network should be up and running.
- __8 Highlight the AMD PCnet Adapter in the Network Control Panel and select the File Sharing Box. Choose the appropriate box here.
- __9 The experienced user can choose the advanced button in the Network Control panel of Settings and set the appropriate parameters.

7.1.4. Win 95 NDIS 3.x Driver Installation When Controller Is Not Detected On System Boot

- __1 Click on the Start button, choose Settings, and then choose Control Panel.
- __2 Choose the Network icon and then click on Add.
- __3 Select the AMD PCnet Family Adapters, from which the appropriate adapter type can be chosen.
- __4 The user may be prompted to choose the I/O resources. Select resources without any conflicts.
- __5 The experienced user can choose the advanced button in the Network Control panel of Settings and can set the appropriate parameters.
- __6 Highlight the AMD PCnet Adapter in the Network Control Panel and select the File Sharing Box. Choose the appropriate box here.
- __7 On completion, shutdown the system and then reboot. The NDIS 3.x driver should be up and running now.

7.1.5. Installation of the WINNT 3.51 NDIS 3.x Driver

This installation procedure is the same procedure as for the WINNT 3.1/3.5 driver. Refer to Section 7.1. The AMD WINNT 3.51 NDIS 3.x driver is in distribution diskette 6 under the WINNT 3.51 subdirectory. There is only one difference. The WINNT 3.51 will detect the PCnet-PCI controller if it is in the system and the PCI-only dialog box will appear. This means the user does not have to select the Bus To Scan for PCI controllers.

If there is a non-PCI controller in the system, then the AMD PCnet VL/ISA dialog box appears, and the appropriate parameters can be chosen as in the WINNT 3.1/3.5 driver case.

If there is a PCI and an ISA/VL controller in the same system, then the PCI controller is detected first, and the PCI dialog box appears. Then, when the user adds the next adapter, the AMD PCnet VL/ISA dialog box appears and the appropriate parameters can be chosen as in the WINNT 3.1/3.5 driver case.

Note: *This driver will work on WINNT 3.51 onwards only and is not compatible with NT 3.1/3.5. The name of the driver has changed to AMDPCN.SYS.*

7.1.5.1. NDIS 3.x Driver Keywords

See Table 4 for the NDIS 3.x Driver Keywords.

Table 4. NDIS 3.x Driver Keywords

Keyword Description	Keyword Name	Additional Keyword Details	Range	Default
I/O Address	IOADDRESS	See Common Keywords.		
Interrupt	INTERRUPT	See Common Keywords.		
DMA	DMACHANNEL	See Common Keywords.		
Bus type designation	BUS_TO_SCAN	See AMD Driver Specific Keywords.		

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Net Address	NETADDRESS	This keyword allows the user to specify or overwrite the IEEE or Mfr. address. This must be edited in PROTOCOL.INI or NT registry.	Any valid IEEE address or Not Present	Not Present
Full Duplex	FDUP * Supported on PCnet-ISA II only	FDUP keyword is used to enable or disable full duplex on the 10BaseT and AUI ports. See Common Keywords.	UTP AUI OFF	Not Present (What is on the EEPROM)

Note: All of the keywords available to the NDIS 3.x driver may be activated by selecting the options through a dialog box in the **appropriate operating system**.

7.2. Installation of the NDIS 4.x Driver

The Network Driver Interface Specification (NDIS 4.x) was developed by Microsoft to offer a standard driver interface for adapter cards. AMD's NDIS 4.x driver supports the following environments:

- Microsoft Windows NT 4.0
- Microsoft Windows 95 OSR2 and above (Memphis, etc.)

Installation details for AMD's NDIS 4.x driver are described below.

7.2.1. Microsoft Windows NT

Support is provided for Microsoft Window NT (Version 4.0) environment.

- Notes:**
1. *The directory structure that is provided on the AMD NDIX 4.x driver diskette has been set up for automatic OEM installation. Also, more information can be found in the Microsoft Windows NT User's Guide.*
 2. *Only x86-based Windows NT platforms are supported.*

Follow the steps listed below:

- 1 Insert the AMD NDIS 4.x driver diskette into the floppy drive.
- 2 From the Control Panel in the Windows NT Main window, double click on the Network icon to install the PCnet adapter card.
- 3 From the Network Settings dialog box, choose Adapter and click Add.
- 4 From the Select Network Adapter dialog box, click Have Disk button.
- 5 From the Insert Disk window, enter:
A:\WINNT\MINIPORT\NDIS4
- 6 On completion of the installation, the user will be prompted to shut down the system. When the system comes up again, the network should be up and running.
- 7 Highlight the AMD PCnet adapter in the Network Control Panel and select the File Sharing box. Choose the appropriate box here.
- 8 The experienced user can choose the Advanced button in the Network Control Panel settings and set the appropriate parameters.

8. Installing the SCO Unix LLI Driver (ODT 3.0 and below)

Support is provided for the SCO UNIX (Version 3.2.4) environment. The SCO UNIX LLI stream-based driver should be installed from the command line prompt.

- Notes:**
- 1) Support for Version 3.2.2 is no longer provided by AMD.
 - 2) The directory structure that is provided on the AMD SCO Unix driver diskette has been set up for automatic OEM installation. The OEM Installation section of this manual provides more details regarding OEM driver installation. Also, more information can be found in the SCO UNIX User's Guide.

8.1. Driver Installation From The Command Line Prompt

If you currently have an older SCO UNIX driver installed in your system, you should remove it prior to installing a newer version. Use the netconfig and custom utilities to remove the older driver version. Refer to your SCO UNIX OS documentation as needed. After removing your existing driver, you may then proceed with installing a newer SCO UNIX driver.

Note: The custom and netconfig utilities are provided by SCO.

Follow the steps listed below:

- __1 Login in as root.
- __2 Insert the AMD SCO UNIX LLI driver diskette into floppy drive A. Make sure the floppy drive in which this diskette is inserted is fd0. This is the default floppy drive where the SCO UNIX custom utility will look for the driver and the corresponding installation script.
- __3 Run the custom utility by typing:

custom

Then press <Enter>

Note: If you are using drive B, run the custom utility with the -m option to specify the correct drive where the AMD SCO UNIX LLI driver diskette is located.

- __4 In the custom utility main menu, you will see four main options at the upper left hand corner of the screen (Install, Remove, List, Quit). Use the right/left arrow keys to select the Install option and then press <Enter>.
- __5 Next, use the up/down arrow keys to select A new product and press <Enter>.
- __6 Three options will be displayed (Entire Product, Packages, Files). Select Entire

Product and press <Enter>.

- __7 The following message will be displayed:

```
Insert the requested volume and press <Return> to continue the  
installation
```

```
Insert:      Distribution  
            Floppy Volume 1
```

```
Continue     Quit
```

Press <Enter> to continue.

- __8 The following message will be displayed:

```
Installing custom data files...
```

```
Insert the requested volume and press <Return> to continue the  
installation
```

```
Insert:      AMD PCnet Family LLI Driver  
            Floppy Volume 1
```

```
Continue     Quit
```

Press <Enter> to continue.

- __9 The following message will be displayed:

```
Extracting files...
```

```
Checking file permissions...
```

You will then be returned to the custom utility main screen.

- __10 Select Quit from the custom utility main options. Answer Yes you want to exit from the custom utility. You will then be returned to the Unix prompt.

- __11 Next, run the netconfig utility by typing:

```
netconfig
```

Then press <Enter>.

The netconfig utility is used to configure the SCO UNIX driver for different INT, DMA, and I/O address values. This utility is also used to add the driver to the protocol chain.

Note: *The netconfig utility modifies the space.c file automatically and must be used in order to get proper support for PCI BIOS API calls.*

__12 The following will be displayed:

```
Available options:  
    1. Add a chain  
    2. Remove a chain  
    3. Reconfigure an element in a chain  
    q. Quit  
Select Option:
```

Select option 1 (Add a chain) by typing:

1

Then press <Enter>.

__13 The following will be displayed:

```
Select top level of chain to Add or q to quit:
```

Select the appropriate top level of chain for your system by entering the appropriate number (Num) value and pressing <Enter>.

__14 Next, select the appropriate number (Num) value for the AMD PCnet Ethernet driver and press <Enter>.

__15 Answer all of the questions asked by netconfig as appropriate for your system. Refer to your SCO UNIX OS documentation as needed. Also, see the *Software Keyword* section in this manual for more details on keyword settings.

Note: If you need to modify keyword values, you should edit the space.c file as needed. The path for this file is:

```
/etc/conf/pack.d/pnt0/space.c
```

__16 Select Quit from the netconfig utility by typing q and then press <Enter>.

__17 At this point, you should relink your kernel and reboot the system. Refer to your SCO UNIX OS documentation as needed.

The installation of the SCO UNIX LLI driver is now complete.

8.2. SCO Unix LLI Driver Keywords

Keywords can be added, deleted, and/or modified by manually editing the appropriate #define values in the space.c file. See Appendix B (*Software Keywords*) and your *SCO UNIX Manuals* for more details. A sample version of this file is listed below:

```
/****************************************************************************
 * Copyright (c) 1993 Advanced Micro devices, Inc.                         */
/*                                                                       */
/* File:          /etc/conf/pack.d/pnt0/space.c                           */
/* Version:       1.0                                                       */
/* Description:   SCO Unix System V/386 Config. file for PCnet family    */
/* Author:        Leonid Grossman                                         */
/* Created:      08/20/93                                                 */
/*************************************************************************/
#include config.h

#if defined(PNT3_UNITS)
#define TOT_UNITS (PNT3_UNITS+PNT2_UNITS+PNT1_UNITS+PNT_UNITS)
#elif defined(PNT2_UNITS)
#define TOT_UNITS (PNT2_UNITS+PNT1_UNITS+PNT_UNITS)
#elif defined(PNT1_UNITS)
#define TOT_UNITS (PNT1_UNITS+PNT_UNITS)
#else
#define TOT_UNITS (PNT_UNITS)
#endif
#define MAX_MINORS 16 /* Please do not modify */
#define TX_BUFFERS_0 16 /* Must be power of 2 (1,2,4,8,...512) */
#define TX_BUFFERS_1 16
#define TX_BUFFERS_2 16
#define TX_BUFFERS_3 16
#define RX_BUFFERS_0 16
#define RX_BUFFERS_1 16
#define RX_BUFFERS_2 16
#define RX_BUFFERS_3 16
#define SCAN_TYPE_0 0 /* 0-all, 1-PCI, 2-PnP, 3-VESA, 4-ISA, 5-PCI1, 6-PCI2 */
#define SCAN_TYPE_1 0
#define SCAN_TYPE_2 0
#define SCAN_TYPE_3 0
#define LED0_0 0xffffffff /* 0xffffffff - defaults */
#define LED0_1 0xffffffff
#define LED0_2 0xffffffff
#define LED0_3 0xffffffff
#define LED1_0 0xffffffff
#define LED1_1 0xffffffff
#define LED1_2 0xffffffff
#define LED1_3 0xffffffff
#define LED2_0 0xffffffff
#define LED2_1 0xffffffff
#define LED2_2 0xffffffff
#define LED2_3 0xffffffff
#define LED3_0 0xffffffff
#define LED3_1 0xffffffff
#define LED3_2 0xffffffff
#define LED3_3 0xffffffff
#define dmarotate_0 0 /* 0 - normal priority, 1 - rotate priority */
#define dmarotate_1 0
#define dmarotate_2 0
#define dmarotate_3 0
#define tp_0 0 /* 0 - the autoselect mode, 1 - the UTP mode */
#define tp_1 0
#define tp_2 0
#define tp_3 0
#define fdup_0 0 /* 0 - default, 1 - AUI, 2 - 10BaseT, 3 - OFF */
```

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```
#define fdup_1 0
#define fdup_2 0
#define fdup_3 0
/* Please do not modify ACCESS_TYPE and LAST_BUS parameters */
/* unless you are sure that the values provided by 'netconfig' are wrong */
#define ACCESS_TYPE_0 0
#define ACCESS_TYPE_1 0
#define ACCESS_TYPE_2 0
#define ACCESS_TYPE_3 0
#define LAST_BUS_0 256
#define LAST_BUS_1 256
#define LAST_BUS_2 256
#define LAST_BUS_3 256

int     pnt_MaxStreams = MAX_MINORS;
int     pnt_TotalDevCount = TOT_UNITS;

/*
 * Structure used in space.c to pass configuration to driver. This information
 * is copied to the pnt_DeviceStruct structure.
 */

struct pnt_ConfigStruct {
    short index;                      /* board index */
    short minors;                     /* minor devices configured */
    short vec;                        /* interrupt vector # */
    short iobase;                    /* boards base memory address */
    short ioend;                     /* Ending base I/O address */
    short dma;                        /* DMA channel used by the board */
    short tx_buffers;                /* Number of Transmit buffers*/
    short rx_buffers;                /* Number of Receive buffers*/
    long bus_scan;                   /* Bus type to search for */
    long led0;                        /* LED value */
    long led1;                        /* LED value */
    long led2;                        /* LED value */
    long led3;                        /* LED value */
    long dmarotate;                  /* */
    long tp;                          /* */
    long fdup;                        /* */
    long access_type;                /* */
    long last_bus;                   /* */
};

struct pnt_ConfigStruct pnt_ConfigArray[TOT_UNITS] = {
#if defined PNT_UNITS
    {0,
     MAX_MINORS,
     PNT_0_VECT,
     PNT_0_SIOA,
     PNT_0_EIOA,
     PNT_CHAN,
     TX_BUFFERS_0,
     RX_BUFFERS_0,
     SCAN_TYPE_0,
     LED0_0,
     LED1_0,
     LED2_0,
     LED3_0,
     dmarotate_0,
     tp_0,
     fdup_0,
     ACCESS_TYPE_0,
     LAST_BUS_0
    }
#endif
}
```

```
#endif
#if defined PNT1_UNITS
    ,{1,
     MAX_MINORS,
     PNT1_0_VECT,
     PNT1_0_SIOA,
     PNT1_0_EIOA,
     PNT1_CHAN,
     TX_BUFFERS_1,
     RX_BUFFERS_1,
     SCAN_TYPE_1,
     LED0_1,
     LED1_1,
     LED2_1,
     LED3_1,
     dmarotate_1,
     tp_1,
     fdup_1,
     ACCESS_TYPE_1,
     LAST_BUS_1
    }
#endif
#if defined PNT2_UNITS
    ,{2,
     MAX_MINORS,
     PNT2_0_VECT,
     PNT2_0_SIOA,
     PNT2_0_EIOA,
     PNT2_CHAN,
     TX_BUFFERS_2,
     RX_BUFFERS_2,
     SCAN_TYPE_2,
     LED0_2,
     LED1_2,
     LED2_2,
     LED3_2,
     dmarotate_2,
     tp_2,
     fdup_2,
     ACCESS_TYPE_2,
     LAST_BUS_2
    }
#endif
#if defined PNT3_UNITS
    ,{3,
     MAX_MINORS,
     PNT3_0_VECT,
     PNT3_0_SIOA,
     PNT3_0_EIOA,
     PNT3_CHAN,
     TX_BUFFERS_3,
     RX_BUFFERS_3,
     SCAN_TYPE_3,
     LED0_3,
     LED1_3,
     LED2_3,
     LED3_3,
     dmarotate_3,
     tp_3,
     fdup_3,
     ACCESS_TYPE_3,
     LAST_BUS_3
    }
#endif
};
```

9. Installing The SCO Unix MDI Driver (SCO OpenServer 5.0 and above)

Note: For PCnet Software Release 3.x only.

SCO OpenServer 5.0 has built-in support for the PCnet driver. See the SCO documentation for the network driver installation directions.

To upgrade the AMD PCnet driver to the 3.0 Version, follow the steps below:

- __1 Copy the install file from the SCOUNIX.50 directory on diskette 6. The file is in DOS format. It can be copied with the `doscp` command or from the DOS MERGE session.
- __2 Run `sh install` command to upgrade the PCnet MDI driver package.

9.1. SCO Unix MDI Driver Keywords

Keywords can be added, deleted, and/or modified by using the ADVANCED button for PCnet driver during netconfig installation. See Appendix B (*Software Keywords*) and your *SCO UNIX Manuals* for more details. The SCO MDI driver has an additional keyword, `pcnet2` . If set to a non-zero value, the `pcnet2` keyword enables advanced features for the PCnet-PCI2 chip.

